

Standards of Cover

TRUCKEE MEADOWS

FIRE PROTECTION DISTRICT



Prepared by:



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The All Risk Standards of Cover was produced under the direction of the Washoe County Nevada County Commissioners, Washoe County Manager Katy Simon and Washoe County Fire Service Coordinator Kurt Latipow.



The All Risk Standards of Cover compiled by
Diamante Partners



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ECOMM (Reno and Washoe County 911)

Washoe County Fire Coordinator

Washoe County Manager

Washoe County Volunteer Fire Agencies

The County of Washoe Requested in its RFP2662-09 the following scope of work:

12.1.3 Conduct a Standards of Response Cover Deployment Analysis. This approach uses risk and community expectations on outcomes to assist fire department leadership and elected officials in making informed decisions on fire and EMS deployment levels. The Standards of Response Cover process consists of eight parts:

1. Existing deployment- each agency has something in place today
2. Community outcome expectations-what is expected of the response agency
3. Community risk assessment- what assets are at risk in the community
4. Critical Task Time Study- what must be done over what time frame to achieve the stated outcome expectation(s).
5. Distribution Study- the location of first-due resources
6. Concentration Study-first alarm assignment or effective response force
7. Reliability & Historical response effectiveness studies-using prior response statistics to determine what percent of compliance the existing system(s) deliver
8. Overall evaluation-proposed standard of cover statements by risk type. Identify and prioritize critical deficiencies. Answer the question of what we need to do for the future.
9. Add item- Address future delivery system models including governance options as they may relate to the eight (8) previous questions

Diamante Partners have responded and offered the following solution:

Standards of Cover Deployment Analysis: Methodology and Approach Summary

Goal:

*Fire Protection and Emergency Medical Delivery Systems are based on an acceptable risk. The focus of the Standards of Cover (SOC) study for Washoe County that will be conducted by **Diamante Partners LLC** will be to ensure that necessary community stakeholders and elected officials have the opportunity to make informed decisions on what that acceptable risk is and accordingly determine the distribution and concentration of fixed and mobile resources of designated fire and EMS organizations.*

Our Approach:

The Diamante Team will conduct a series of face-to-face community/regional meetings as well as incorporate the use of a web based survey tool to gather input from community stakeholders on expectations of service delivery, given different variables or scenarios. Data collected as a result of this outreach will serve as a valuable tool for elected officials to help them determine priorities for the future. The study will evaluate the eight major components of a SOC utilizing national, state and local standards. Information and guidelines (*risk, department decisions, resource distribution, concentration, and staffing of line companies, etc*) set forth by the following organizations will be reviewed and incorporated into the study:

- 1 International Association of City Managers and the International Association of Fire Chiefs, Commission of Fire Accreditation International (CFAI) ;
- 2 National Fire Protection Association (NFPA);
- 3 Insurance Services Organization (ISO);
- 4 International Code Council (ICC), fire and life safety codes; and,
- 5 Occupational Safety and Health Agency (OSHA) standards
- 6 NRS 474

The SOC will serve as a baseline for the current condition of the Fire Protection and Emergency Medical Delivery System. The Diamante Team will ask that local officials' adopt the final SOC by ordinance, to establish each jurisdiction "standards". This adds a layer of protection to each jurisdiction for liability purposes and will allow a platform to analyze the cost of fire protection and emergency medical services and an opportunity to determine how to methodically improve the system. A SOC is a critical component (baseline) for a master plan.

Our Methodology:

In the development of the SOC Study, the Diamante Team will utilize a "systems" approach to deployment rather than a one-size-fits all prescriptive formula. In a comprehensive approach, each agency should be able to match local need (risks and expectations), with the costs of various levels of service. In an informed public policy debate, each level of governing board "purchases" the fire and EMS protection (insurance) the community needs and can afford.

All Eight Components of Standards of Cover Systems will be addressed:

- 1 Existing deployment
- 2 Risk identification
- 3 Risk expectations
- 4 Service level objectives
- 5 Distribution
- 6 Concentration
- 7 Performance and reliability
- 8 Overall evaluation

Existing Deployment Policies

All agencies have existing policies, even if they are undocumented or adopted by the locally responsible elected officials. Originally, stations and equipment were located to achieve certain expectations. Diamante will look at how and why policies were developed and resources placed to gain historical perspective and an understand and described and contrasted to any proposed changes.

Building Risk Identification and Assessment

Diamante will build a Risk Identification and Assessment consisting of three elements:

- **Fire Flow:** The amount of water to control the emergency, which is based on structure, contents and exposures.
- **Probability:** The likelihood that a particular event will occur within a given Period of time or over a period of time.
- **Consequence:** Includes two components - Life Safety (the amount of emergency personnel and equipment to rescue or protect the lives of an occupant from life threatening situations); and Economic Impact (the losses of property, income or irreplaceable assets).

Building Risk Assessment is performed at three levels of measure:

- **Occupancy Risk:** Diamante will make an assessment of the relative risk to life and property

resulting in a fire inherent in a specific occupancy or in a generic occupancy class.

- **Demand Zone:** An area used to define or limit the management of a risk situation. A Demand Zone can be a single building, or a group of buildings. It is usually defined with geographical boundaries and can also be called fire management areas or fire management zones. Sometimes Demand Zones are a department's data reporting areas from which historical workload can be defined, or DZ's could be a Planning Department data area that could be used to identify and quantify risks with the area.
- **Community:** Diamante will review the overall profile of the community based on the unique mixture of individual occupancy risks, Demand Zone risk levels and the level of service provided to mitigate those risk levels.

EMS and specialty incident response risk assessment and outcome expectations will also be performed using the criteria from identified disciplines. For example, an EMS risk category could be trauma patients, with an expectation to stabilize and transport trauma patients to a designated trauma center within one hour of the accident occurring.

Risk Expectations

Diamante will take what we have found regarding what the risks exist in a particular area or community and recommend policies/procedures on how to deal with the risk, Example recommendations include: Respond to emergencies in risk areas? Deliver prevention and education programs to minimize risks? Or Mitigation and/or control of risks?

Service Level Expectations

After understanding the risks present in a particular area or a community, the Diamante Team will identify what control measures community stakeholders and elected officials expect? For example, does the fire agency confine the fire to the compartment of origin, area of origin, floor of origin, or building of origin? In Washoe County, some agencies in sparsely populated areas with long response times like 30 minutes or more and might have to accept (not like) an exposure level of service where a building fire does not spread to the adjoining forest and start a conflagration. In EMS we might expect to get a trauma patient to the designated trauma center within the first hour. Each risk category found in a particular area or a community will have an outcome expectation developed for it.

Note that risks other than structure fires are typically EMS, special rescue like confined space, hazardous materials, airports and airplanes, etc.

Deployment – Distribution and Concentration

The Diamante Team will then evaluate resource deployment schemes, which are influenced by response time and create an effective response force for each risk category. Our study will include the locating of geographically distributed, first-due resources, for all-risk initial intervention. These station locations(s) are needed to assure rapid deployment to minimize and terminate average, routine emergencies. Distribution is measured by the percentage of the jurisdiction covered by the first-due units within adopted public policy response times. Recommended policies will include "benchmarks" for intervention such as arrival prior to or at flashover; arrival on EMS incidents prior to brain death in cardiac arrest. From risk assessment and benchmark comparisons, the jurisdiction will use critical task analysis to identify needed resource distribution and staffing patterns.

A sample distribution policy statement could be:

"For 90% or 4 minute response time of all incidents, the first-due unit shall arrive within six minutes total reflex time. The first-due unit shall be capable of advancing the first line for fire control or starting rescue or providing basic life support for medical incidents."

The Diamante Team will then look at resource concentration which would include the spacing of multiple resources arranged (close enough together) so that an "effective response force" can be assembled on-scene within adopted public policy time frames. An "initial" effective response force is that which will most likely stop the escalation of the emergency for each risk type. In addressing this task, we will consider risk category type - high-risk areas need second and third due units in shorter time frames than in typical or low risk areas. Concentration pushes and pulls distribution and there is no one perfect mathematical solution. Each agency after risk assessment and critical task analysis has to be able to quantify and articulate why its resource allocation methodology meets the governing body's adopted policies for initial effective intervention on both a first-due and multiple unit basis.

Performance and Reliability

Diamante will review and determine how reliable the Washoe County response system is; do agencies frequently see multiple calls for service (stacked, or queued calls) and do these degrade performance? Are there predictable times of the day, week or year when queued calls occur? Can these occurrences be controlled or can peak hour staffing be used through various models?

Overall Evaluation

Statistics may say one thing, but they may totally disagree with the real world experience. If so, the Diamante Team find out why and keep studying until the numbers come close to reality. Then based on good data, compare and contrast the study findings to community needs, expectations and the ability to afford. **All elected officials will then be presented with a cost-benefit analysis and final plan, not just a recommendation for a change.**

STANDARDS OF COVER OVERVIEW

One major issue the fire service has struggled with in the past decade is defining levels of service. There have been many attempts to create a standard methodology for determining how many firefighters, fire stations, or fire inspectors a community needs.

The diversity of fire service challenges in each community has defied efforts to create a “one size fits all” solution. It is not surprising therefore, that a national or state consensus has never been reached. To address this situation, the International Association of City Managers (ICMA) and the International Association of Fire Chiefs (IAFC) formed the Commission on Fire Accreditation International (CFAI).

This process uses a “systems” approach to deployment rather than a one-size-fits all prescriptive formula. In a comprehensive approach, each agency should be able to match local need (risks and expectations) with the costs of various levels of service. In an informed public policy debate, each city council or governing board “purchases” the fire and EMS protection (insurance) the community needs and can afford.

If resources arrive too late, or are under-staffed, the emergency will continue to escalate drawing more of the agency’s resources into a losing battle. Fire companies must, if they are to save lives and limit property damage, arrive within a short period of time with adequate resources to do the job. To control a fire before it has reached its maximum intensity requires geographic dispersion (distribution) of technical expertise and cost-effective clustering (concentration) of apparatus for maximum effectiveness against the greatest number and types of risk. Matching arrival of resources with a specific point of fire growth or medical problem severity is one of the greatest challenges of chief fire officers today.

Some medical emergencies such as multiple car accidents on a freeway, or industrial accident rescues, require speedy arrival of multiple crews to control the scene, perform rescue operations, and provide medical care. A high-risk area requires timely arrival of fire companies for several reasons. More resources are required to rescue people trapped in a high-risk building with a high occupant load than in a low-risk, building with a low occupant load. More resources are required to control fires in large, heavily loaded structures than are needed for small buildings with limited contents.

There are usually three reasons to redo or challenge existing levels of service - expansion, contraction of service areas (typically the result of a reduction in service area, a decline in risk or value, or a decline in available fire protection funding), and change in risk expectations.

Regardless of the reasons, elected officials should base changes in levels of service on empirical evidence and rational discussion leading to effective, informed policy choices.

The Demographics of Unincorporated Washoe County

Washoe County contains 6,540.4 square miles. The unincorporated area is 6,404.4 square miles. There are approximately 42,154 households in the unincorporated areas. The average household size in 2007 was estimated at 2.70.

The current estimated population for all of Washoe County is 419,948. It is estimated that 113,705 people

live in the unincorporated areas of the County. The population grew by 28.36% between 2000 and 2007. The annual growth during the same time was 3.27%.

Fire service to the unincorporated areas of Washoe County is provided by the Truckee Meadows Fire Protection District (TMFPD), the Sierra Fire Protection District (SFPD), North Lake Tahoe Fire Protection District (NLTFPD) and 13 separate Volunteer Fire Departments (VFD). Three of the VFD's are funded by the Washoe County general fund because they are not contained within a fire district. Five of the VFDs are funded by SFPD and the six are funded by the TMFPD. Each VFD is a 501-C non-profit corporation or association.

Snapshot of the Truckee Meadows Fire Protection District Service Delivery

History of the TMFPD

Truckee Meadows Fire Protection District

The Truckee Meadows Fire Protection District was established in 1972. It entered into a mutual aid agreement with the City of Reno after its formation. Prior to the formation of the District the area was covered by Washoe County, The City of Reno and the City of Sparks. Truckee Meadows Fire Protection District and the Reno Fire Department have had a automatic aid agreement since 1991. Effective July 1, 2000 an INTER-LOCAL AGREEMENT was entered into by and between the City of Reno, a municipal corporation and the Truckee Meadows Fire Protection District organized under NRS 474.460 to provide for consolidation of services and personnel. This Standards of Cover document focuses on the Truckee Meadows Fire Protection District and tried to evaluate the fire and life safety operations of Truckee Meadows.

Governance of the TMFPD and Volunteer Fire Departments

The District is governed by the Board of County Commissioners (BCC) who serves as the TMFPD Board of Fire Commissioners.

The Volunteer Fire Departments in the County are separate federal 501-C non-profit corporations or associations and each are governed by their own Board of Directors. The District and the VFDs have a contract for services. The contract specifies the District provide funding, apparatus, insurances, and equipment in return for qualified volunteers and response. Those Volunteer Fire Departments are Cold Springs, Lemmon Valley, Pleasant Valley, Silver Lake, and Wadsworth Volunteer Fire Departments.

There are two auxiliary units (these are Truckee Meadows units not autonomous to all) which are Hidden Valley and Palomino Valley. The Volunteer Fire Departments have no statutory ability to provide fire protection on their own and need a recognized local government unit to provide the umbrella, hence their affiliation with the Truckee Meadows Fire Protection District.

The legal relationship between a NRS 474 Fire District and volunteers is defined in NRS 474. The law states the District has a responsibility to "support" but does not provide direction regarding authority. The TMFPD and the VFD jointly developed a contract defining each party's obligations.

The District provides liability and workers compensation insurance, vehicle repair, maintenance of apparatus and facilities, facility insurance, utility payments, uniforms, personal protective equipment and

training. In return, each VFD agrees to follow District policy and provide trained and qualified volunteers.

Accountability in meeting training standards has been an area of conflict between the VFD's and their respective Districts. The TMFPD as implemented training levels allowing for additional opportunities for volunteers in support roles.

The Communities of the Truckee Meadows Fire Protection District

The Communities of the Truckee Meadows Fire Protection District

Fire District	Parcels	Assessed Total	Estimated Population	Tax Rate
Truckee Meadows Fire Protection District	34,628	2,989,721,676	89,895	.4713

There are many communities within the Truckee Meadows Fire Protection District which are identified by Truckee Meadow Fire Station area. Detailed information is not available for all geographic areas, and due to the Interlocal Agreement it is difficult to determine what areas are considered within the City of Reno and the Truckee Meadows Fire Protection District.

Truckee Meadows Station 16- East Washoe Station, Truckee Meadows Volunteer Station Pleasant Valley, Station 227 and Station 237.

Communities served:

- East Washoe (Eastlake)
- West Washoe
- Pleasant Valley
- Steamboat Valley
- Franktown Road
- Duck Hill
- Scripps Ranch
- Jumbo Grade

Truckee Meadows Station 14-South Reno Station, Truckee Meadows Volunteer Station Pleasant Valley Station 227 and Station 237 (from Geiger Grade South).

Communities served:

- Steamboat Springs
- Toll Road
- Scorpion Springs
- Virginia Foothills
- Reno SW Suburban
- Reno SE
- Mt. Rose Junction

- Zolezzi Lane area
- Off Lakeside-Holcomb Way area

Truckee Meadows Station 15-Sun Valley Station, Truckee Meadows Volunteer Station- None

Communities served:

- Sun Valley

Truckee Meadows Station 13- Stead Station, Truckee Meadows Volunteer Station Lemmon Valley Station 223, SilverLake Station 221

Communities served:

- Stead
- Silver Knolls
- Antelope Valley
- Lemmon Valley
- Golden Valley
- N. Virginia
- Military Road
- Bird Springs
- Redrock

Truckee Meadows Station 18-Cold Springs, Truckee Meadows Volunteer Station Cold Springs Station 220

Communities served:

- Cold Spring
- Reno Park
- Woodland Village

Truckee Meadows Station 17- Spanish Springs Station, Truckee Meadows Volunteer Station Palomino Valley Auxiliary

Communities served:

- Spanish Springs
- Palomino Valley
- Calle De La Plata
- Axehandle Canyon
- Winnemucca Ranch Road

Reno Station 2 and 21- Truckee Meadows Volunteer Wadsworth Station 225

Communities served:

- Wadsworth

- Mustang
- I-80 Corridor
- Wedekind Dr.

Reno Station 6- Truckee Meadows Station Hidden Valley Auxiliary Station 226

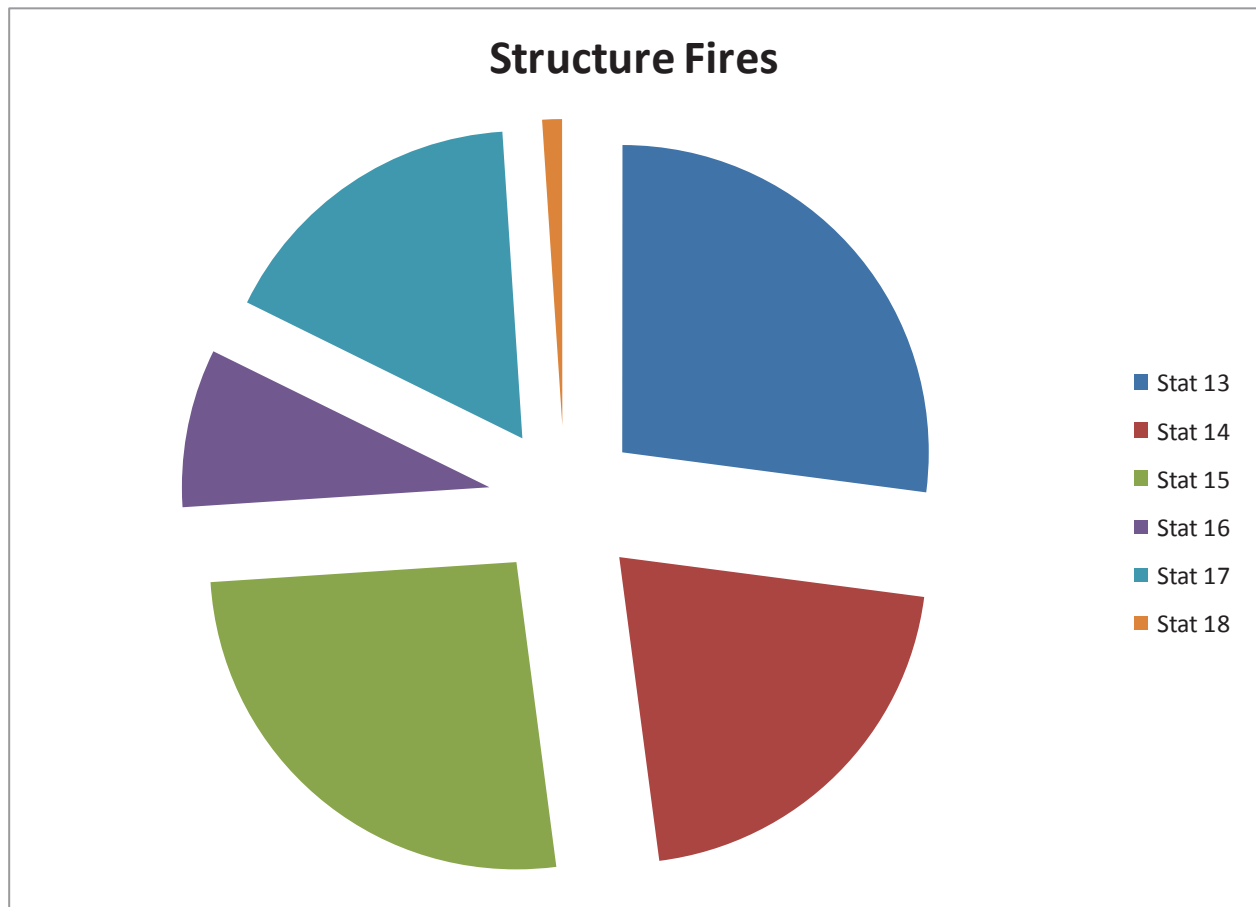
Communities served:

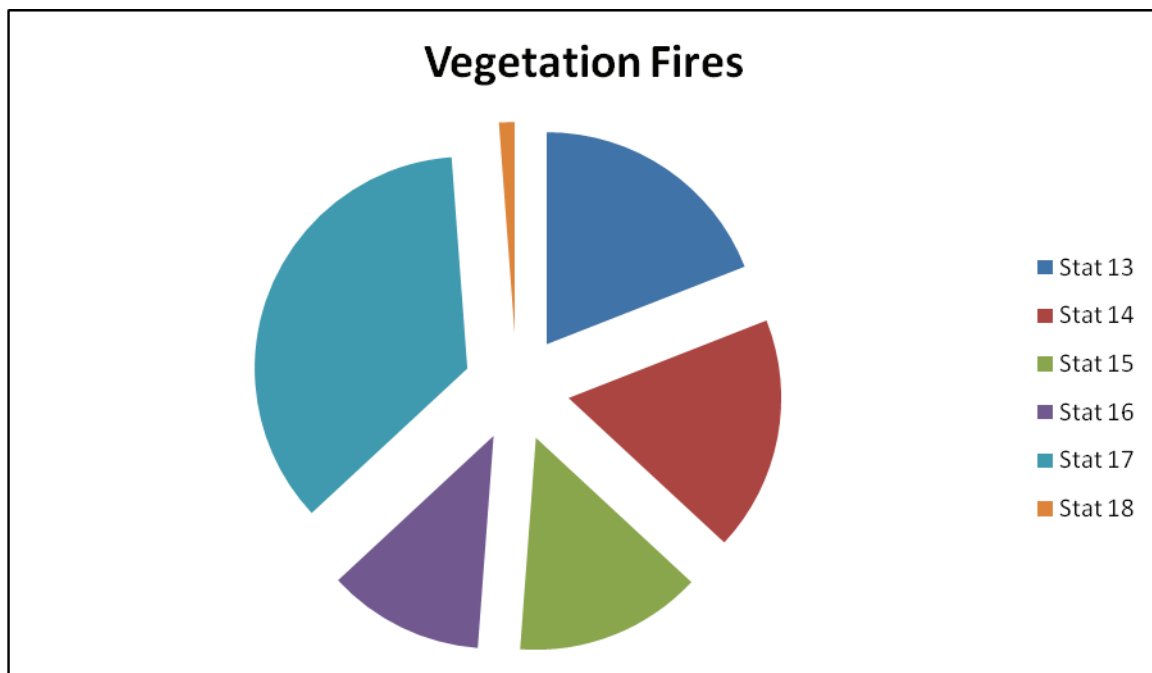
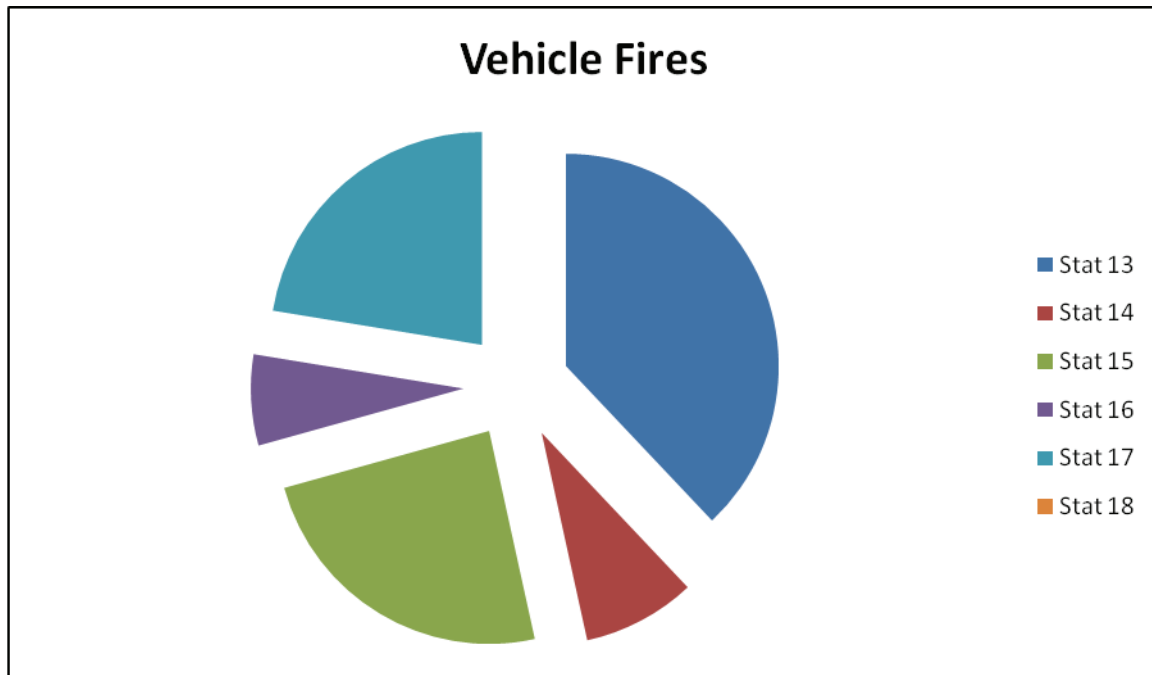
- Hidden Valley
- Longley Lane
- Rattlesnake
- Lakeside Drive

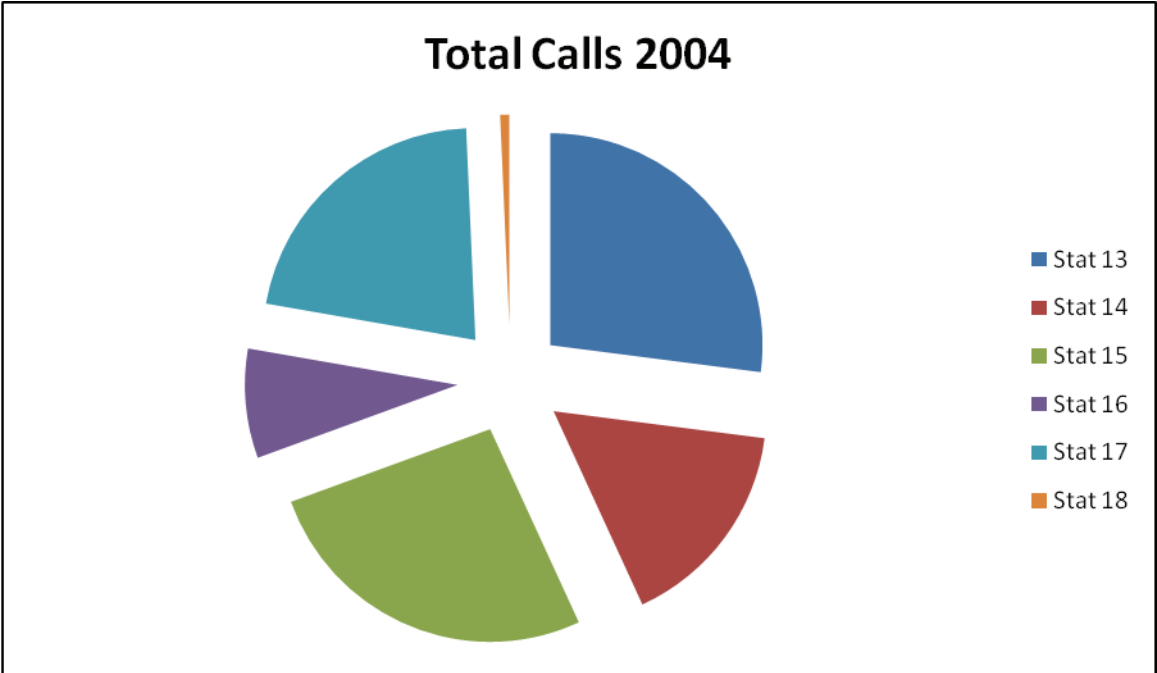
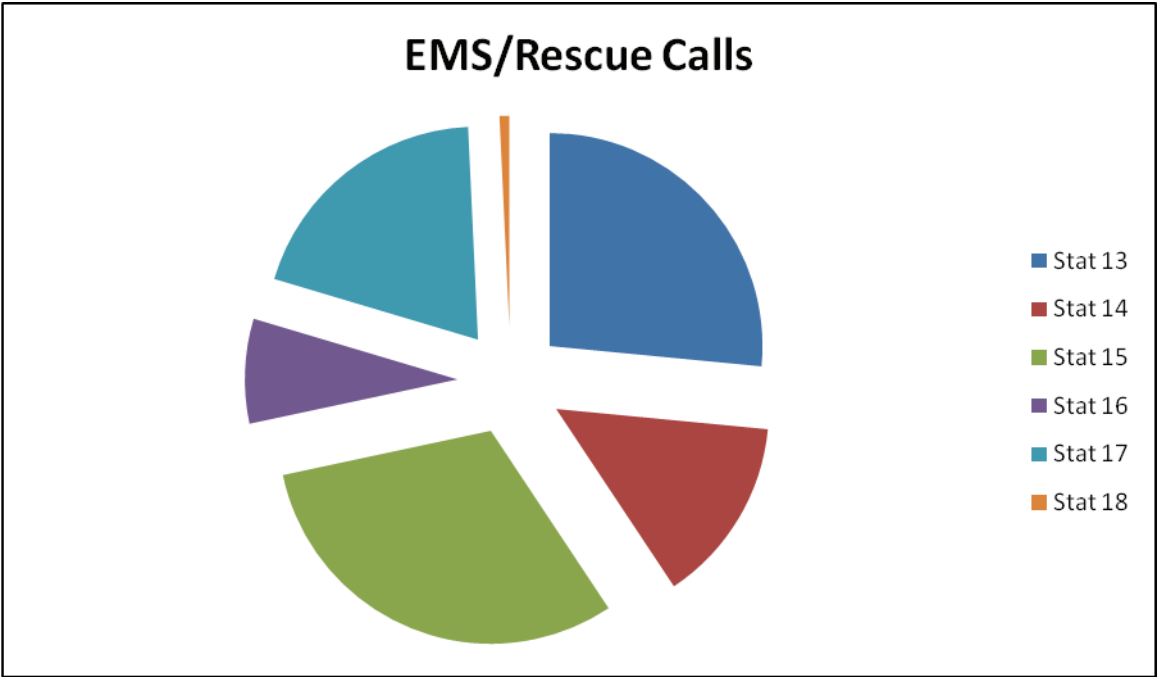
Truckee Meadows Fire Protection District Emergency Activity

Truckee Meadows Fire Protection District
Emergency Response 2004

Incident Type	Stat 13	Stat 14	Stat 15	Stat 16	Stat 17	Stat 18
Structure Fire	26	20	25	8	16	1
Vehicle Fire	22	5	14	4	13	0
Vegetation Fire	16	15	12	10	30	1
Rubbish Fire	13	8	5	2	11	0
Overpressure	1	4	0	0	0	1
EMS/Rescue	815	435	953	244	604	23
Haz Condition	35	47	37	16	28	3
Service Call	104	42	42	12	44	3
Good Intent	108	61	73	56	114	0
False Alarm	56	91	28	11	60	0
Special incident	0	0	2	1	1	0
Total	1239	739	1205	381	988	32

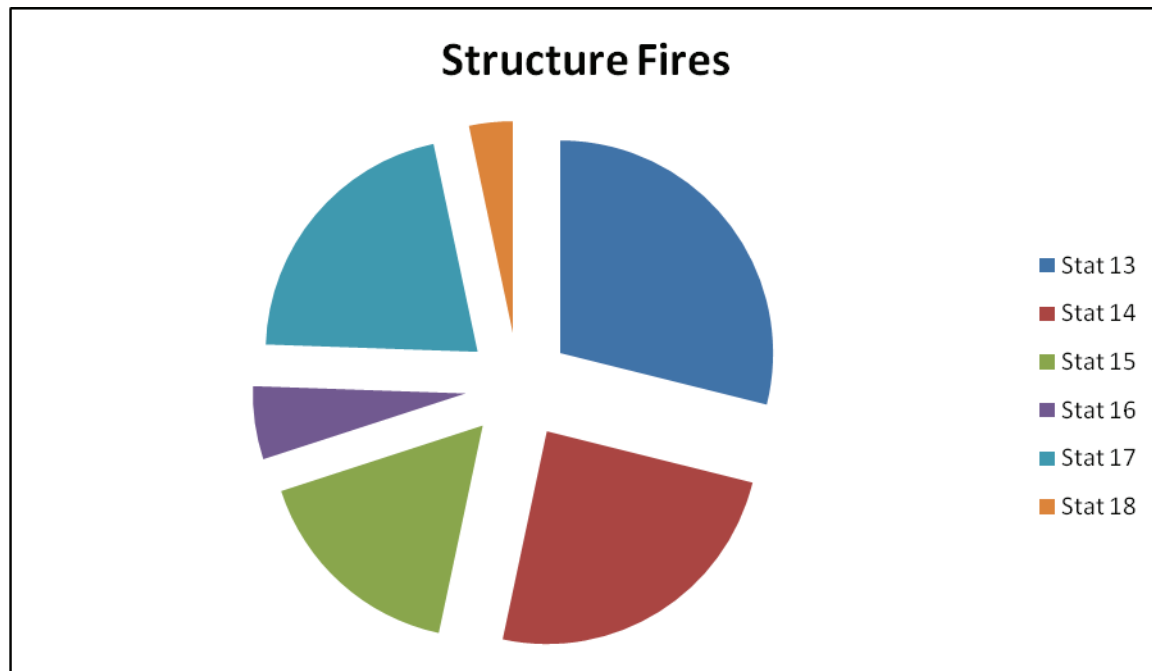


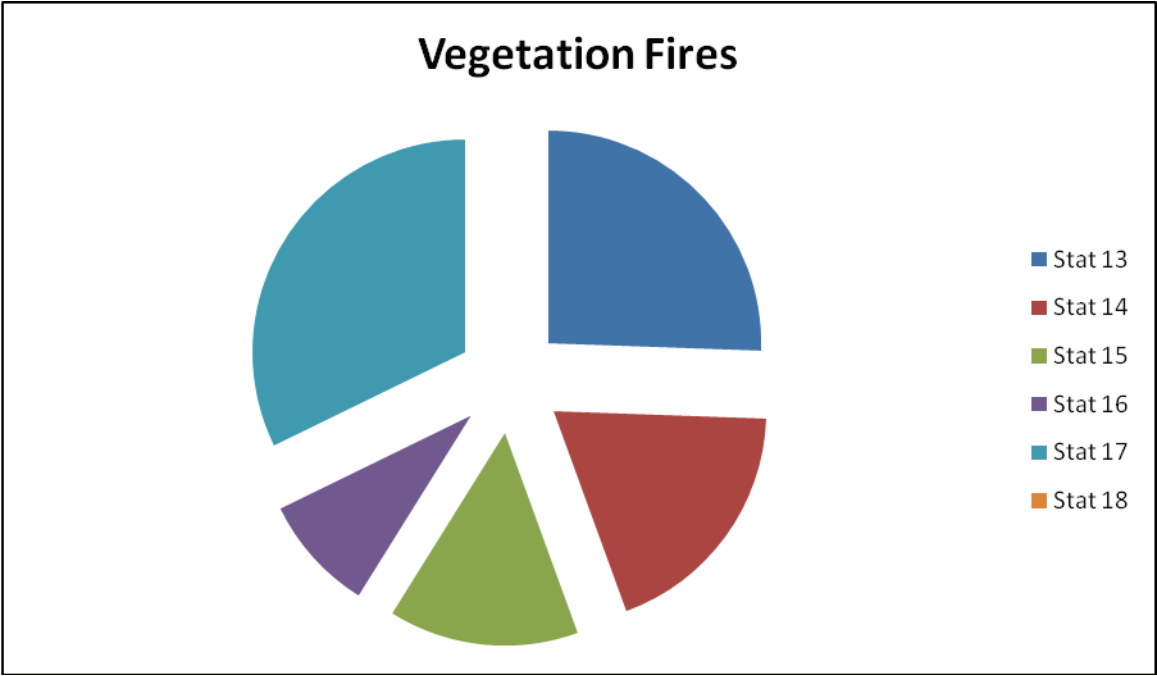
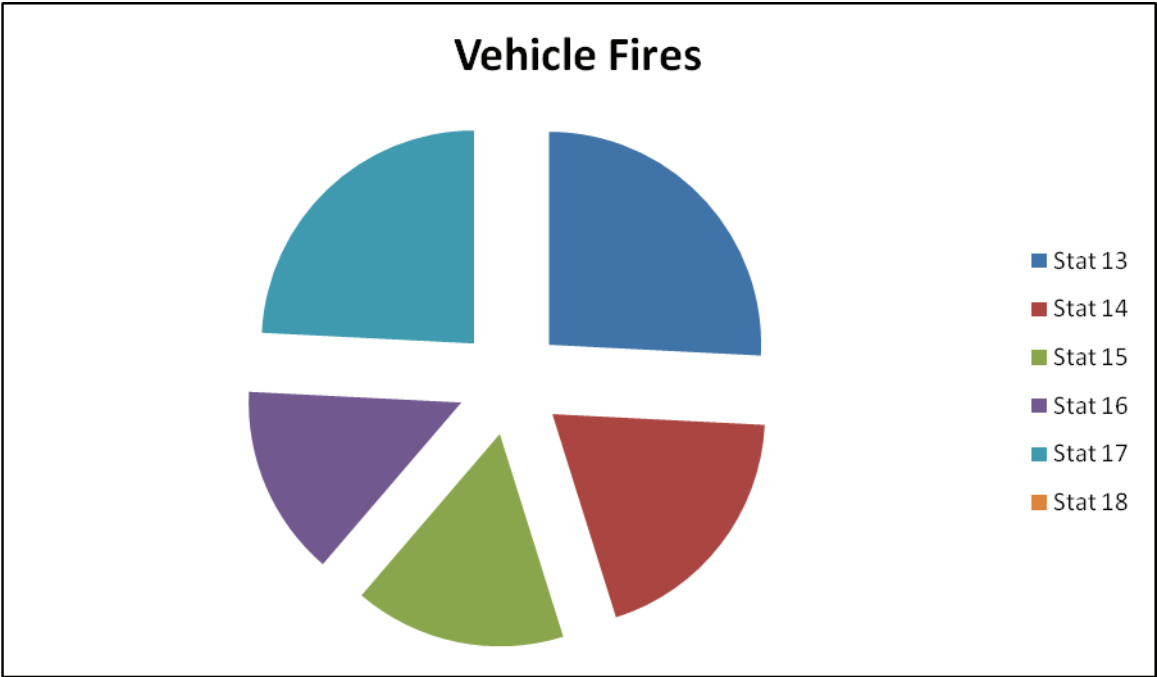


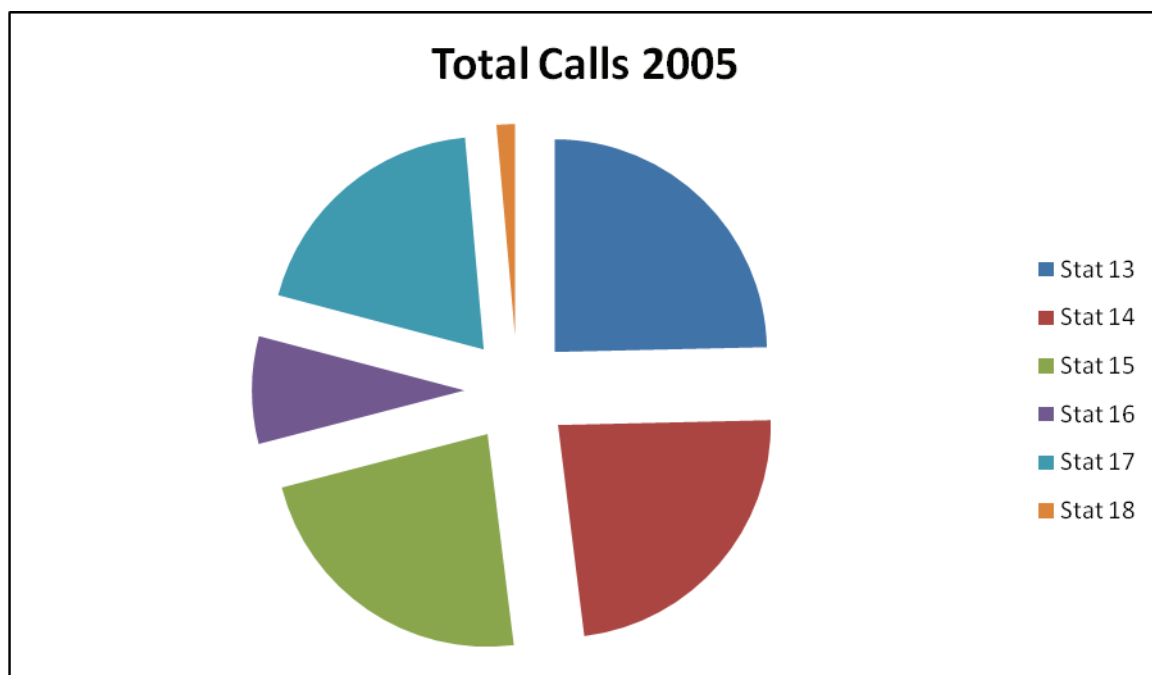
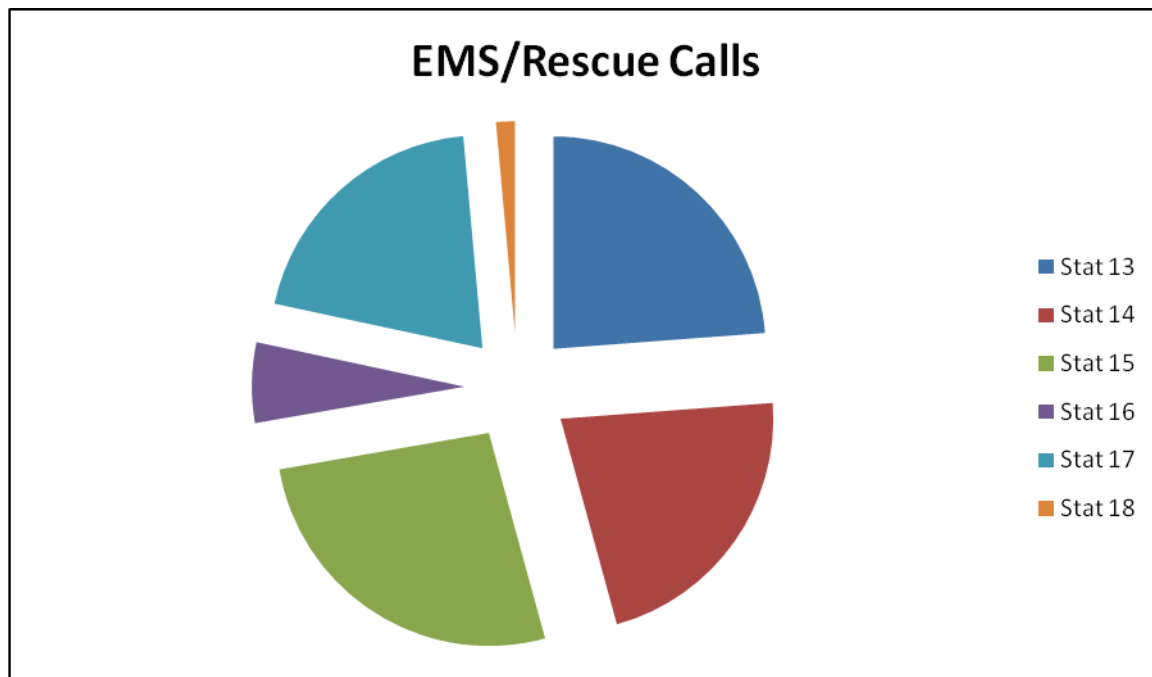


Truckee Meadows Fire Protection District Emergency Response 2005

Incident Type	Stat 13	Stat 14	Stat 15	Stat 16	Stat 17	Stat 18
Structure Fire	26	22	15	5	19	3
Vehicle Fire	16	12	10	9	15	0
Vegetation Fire	23	17	13	8	29	0
Rubbish Fire	11	3	15	4	5	1
Overpressure	0	7	1	0	1	0
EMS/Rescue	824	759	918	211	699	50
Haz Condition	62	48	44	26	21	7
Service Call	69	89	66	43	49	4
Good Intent	157	66	68	67	79	2
False Alarm	56	118	29	20	56	5
Special Incident	3	1	2	2	3	1
Total	1295	1230	1205	429	1024	74



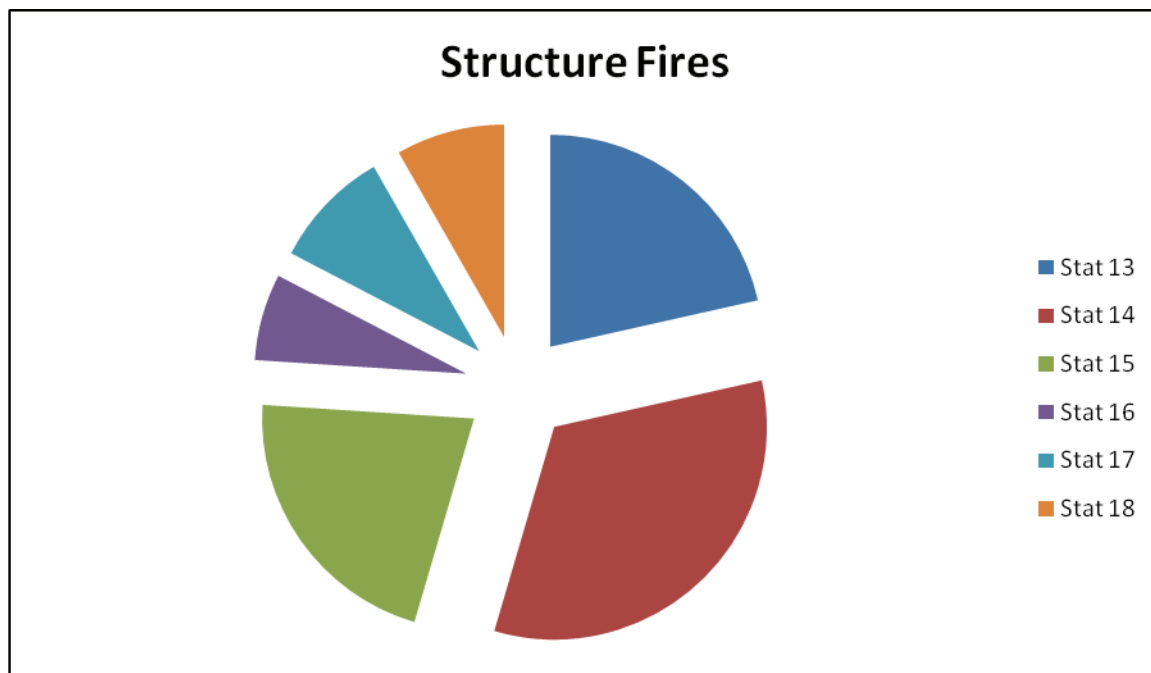


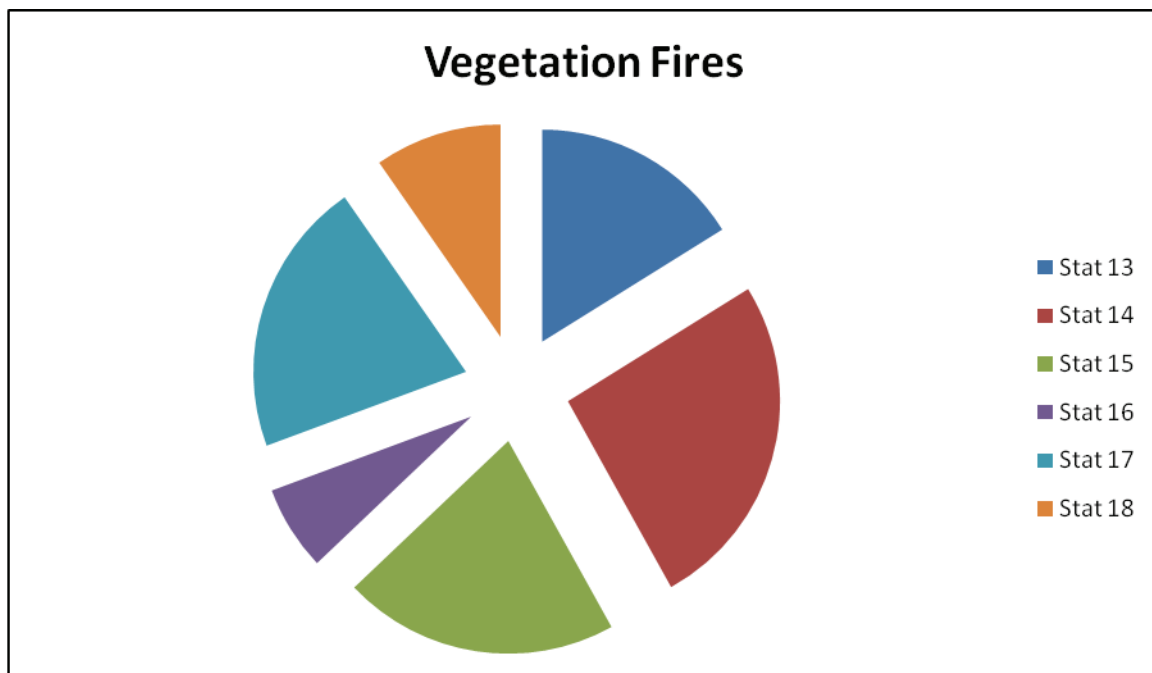
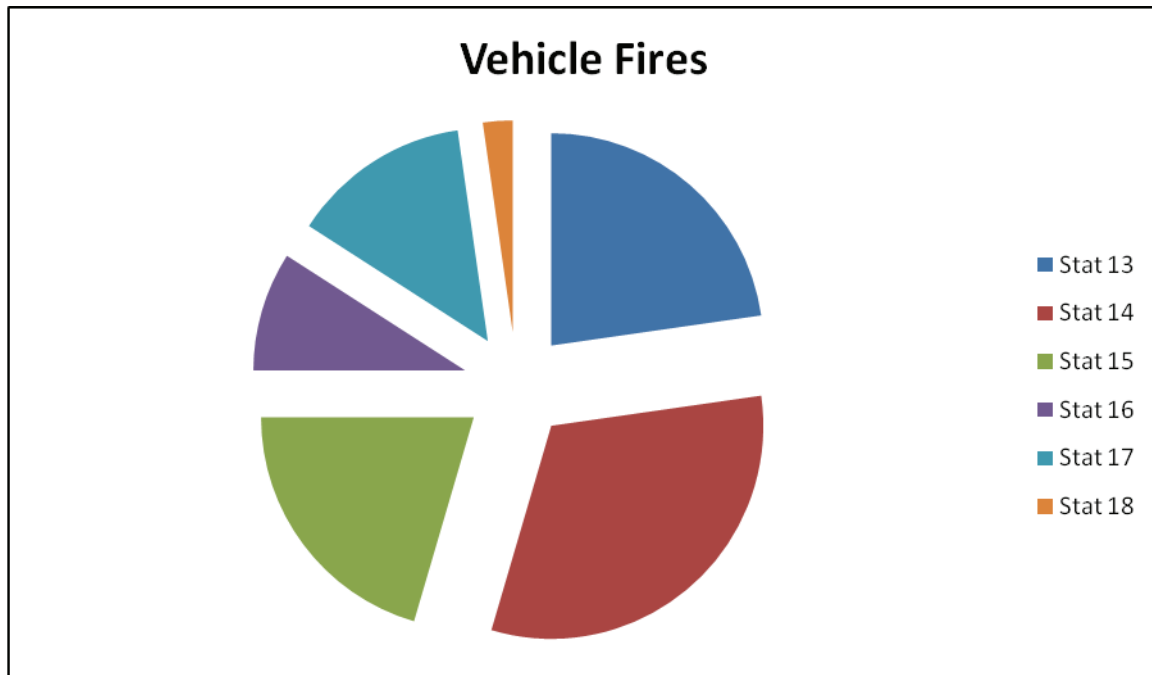


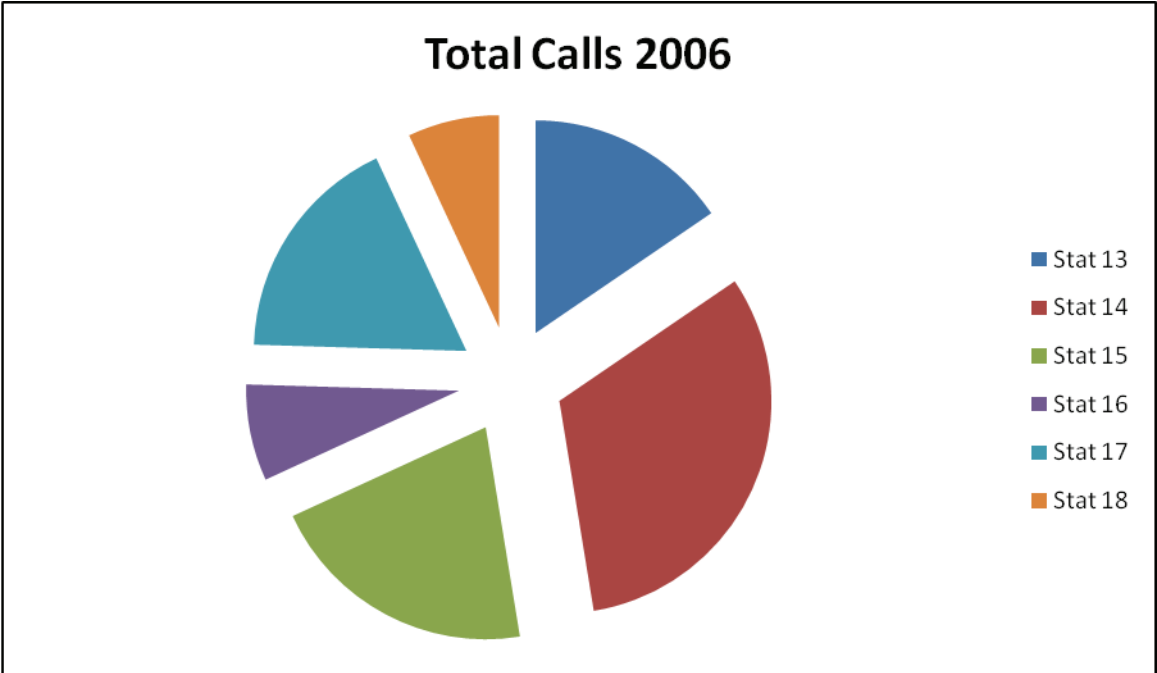
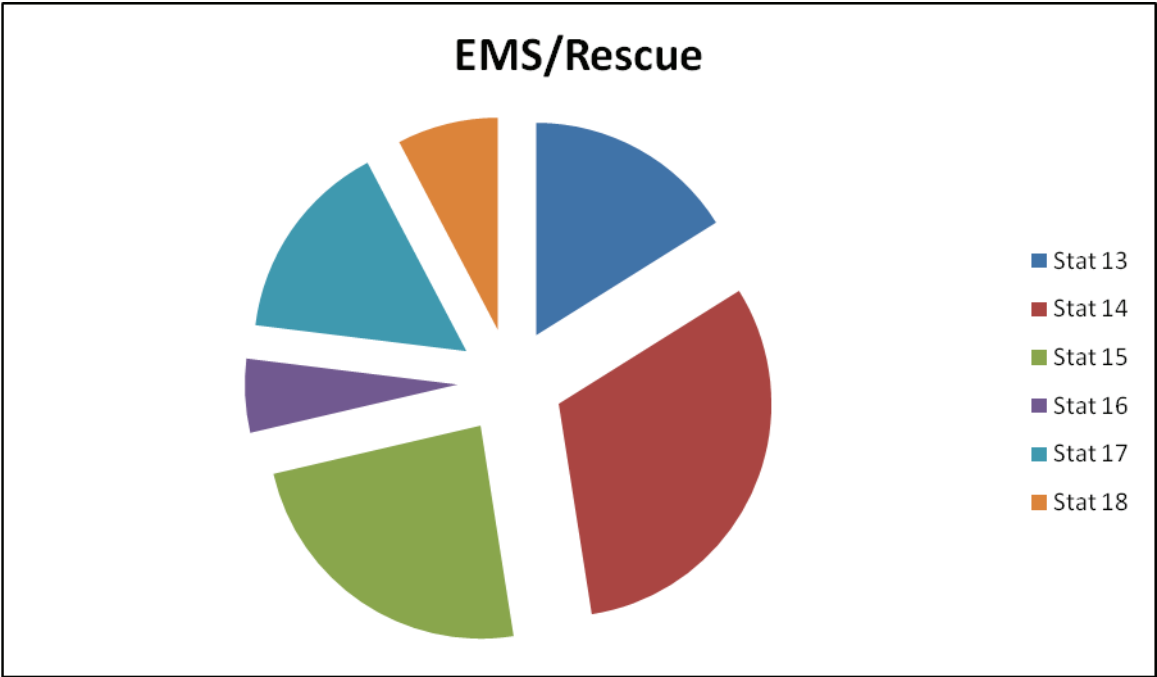
Truckee Meadows Fire Protection District

Emergency Response 2006

Incident Type	Stat 13	Stat 14	Stat 15	Stat 16	Stat 17	Stat 18
Structure Fire	26	40	26	8	11	10
Vehicle Fire	20	28	18	8	12	2
Vegetation Fire	20	32	26	8	26	12
Rubbish Fire	3	2	10	3	6	0
Overpressure	1	4	4	0	0	1
EMS/Rescue	700	1366	1037	243	667	335
Haz Condition	27	65	39	58	39	16
Service Call	47	104	44	34	43	23
Good Intent	135	206	157	70	269	50
False Alarm	60	172	45	19	56	20
Special Incident	0	9	1	3	3	0
Total	1063	2196	1424	504	1207	479



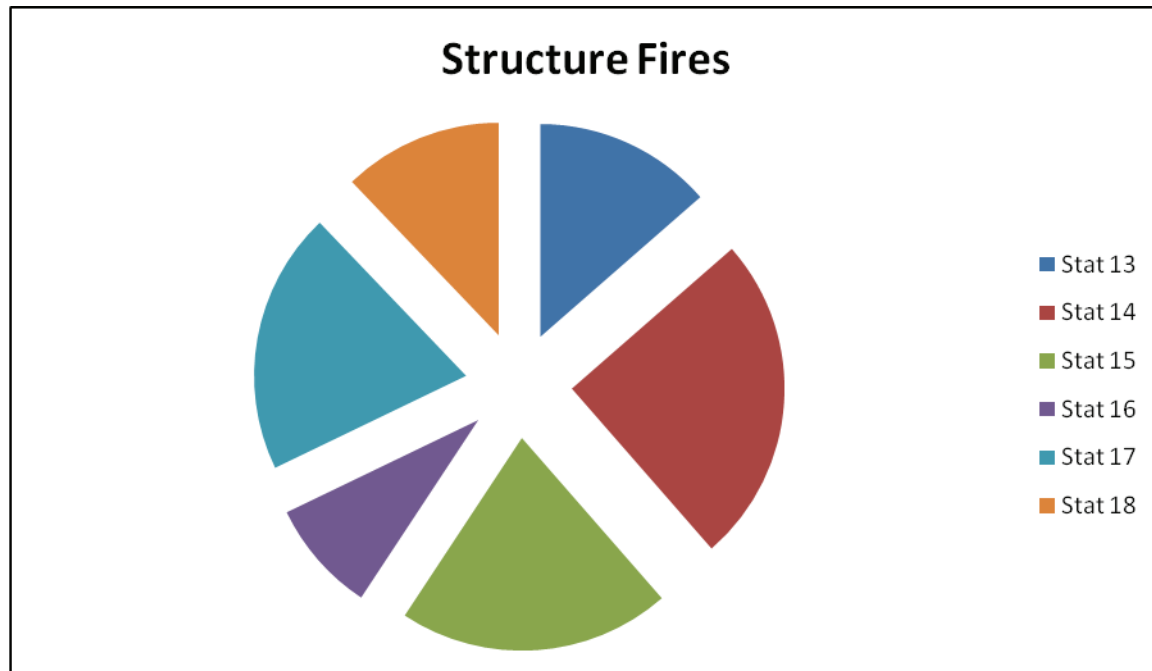


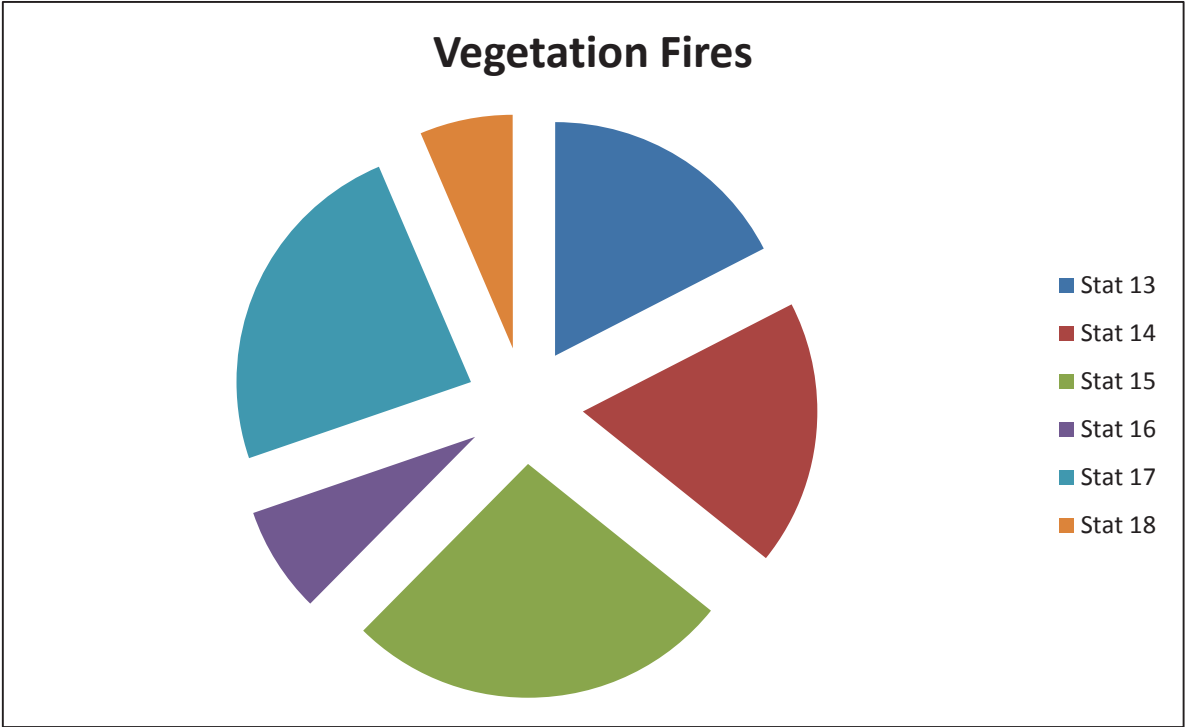
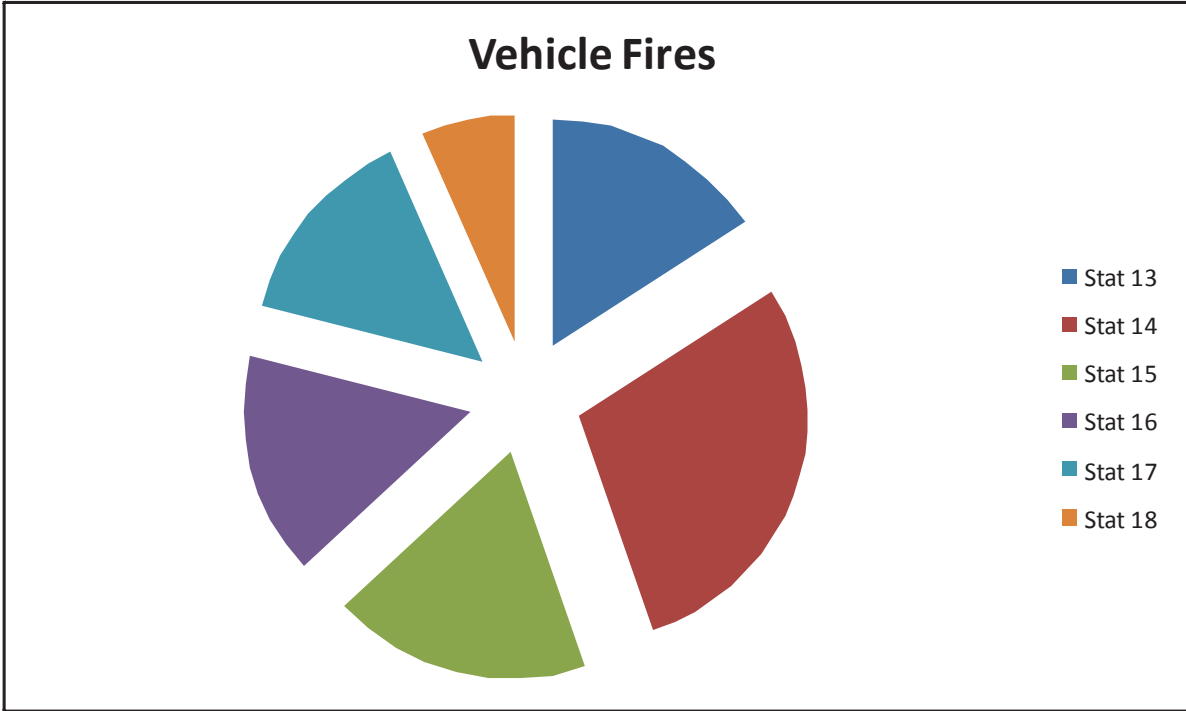


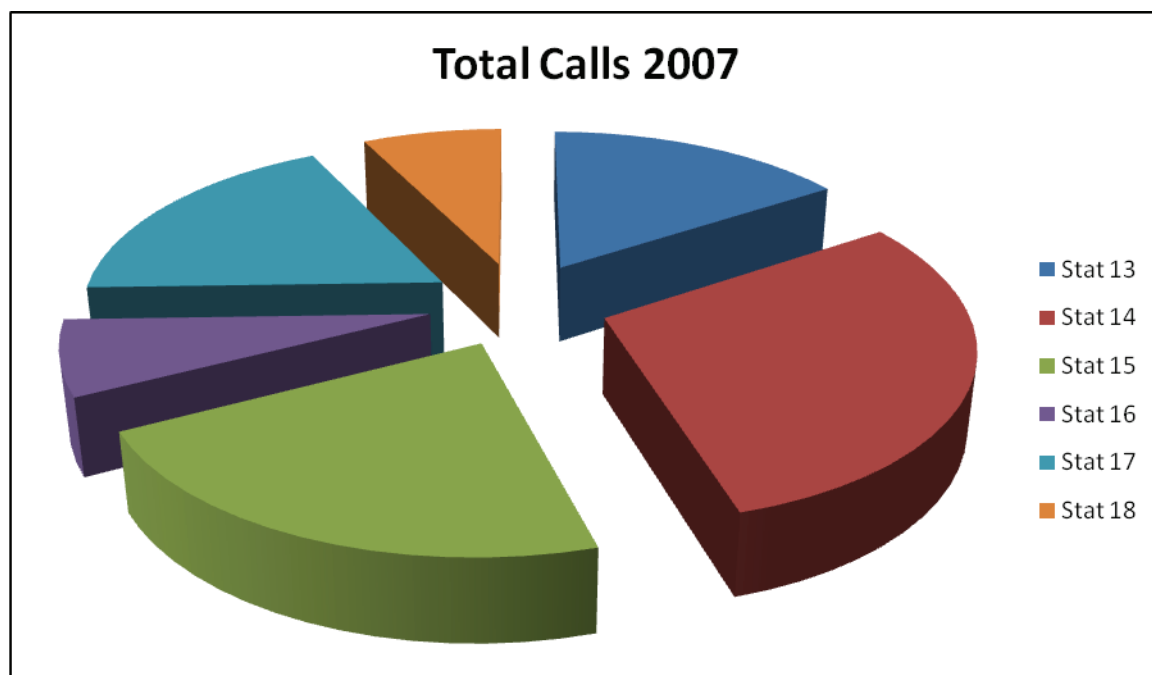
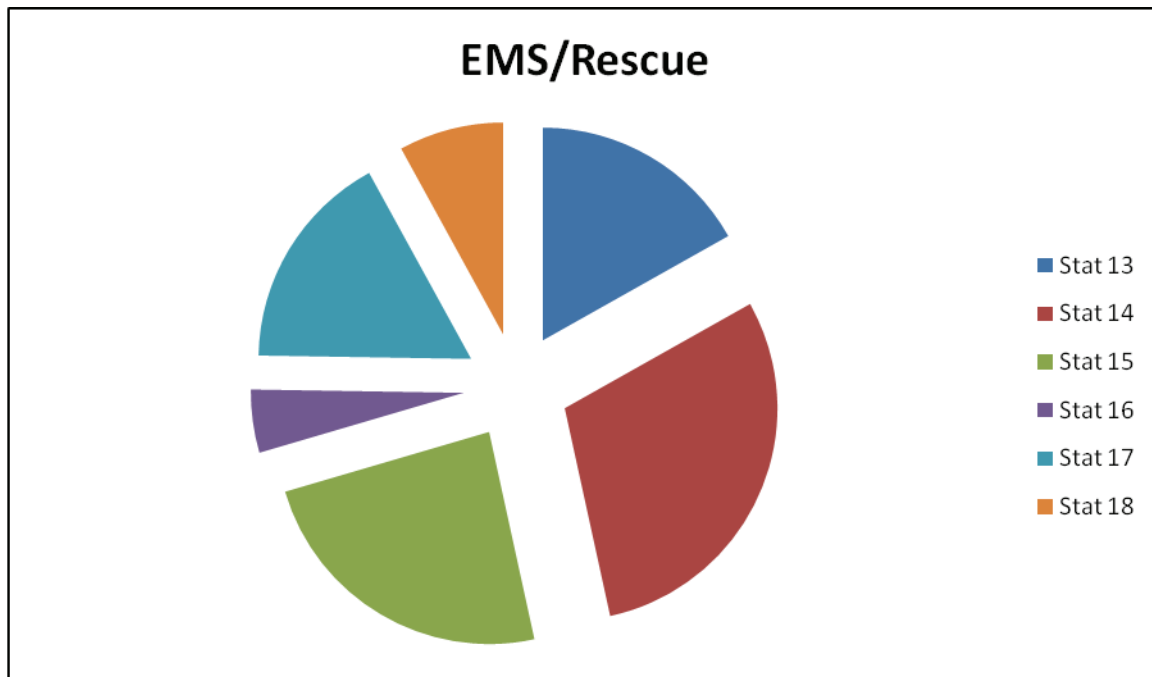
Truckee Meadows Fire Protection District

Emergency Response 2007

Incident Type	Stat 13	Stat 14	Stat 15	Stat 16	Stat 17	Stat 18
Structure Fire	19	35	29	12	28	17
Vehicle Fire	12	22	14	12	11	5
Vegetation Fire	19	20	29	8	26	7
Rubbish Fire	5	1	4	2	1	2
Overpressure	0	7	2	1	2	0
EMS/Rescue	784	1384	1112	223	780	372
Haz Condition	28	42	27	37	26	15
Service Call	68	135	106	75	49	22
Good Intent	134	205	201	92	251	60
False Alarm	53	150	38	14	64	24
Special Incident	0	6	0	1	0	2
Total	1146	2151	1592	511	1314	533



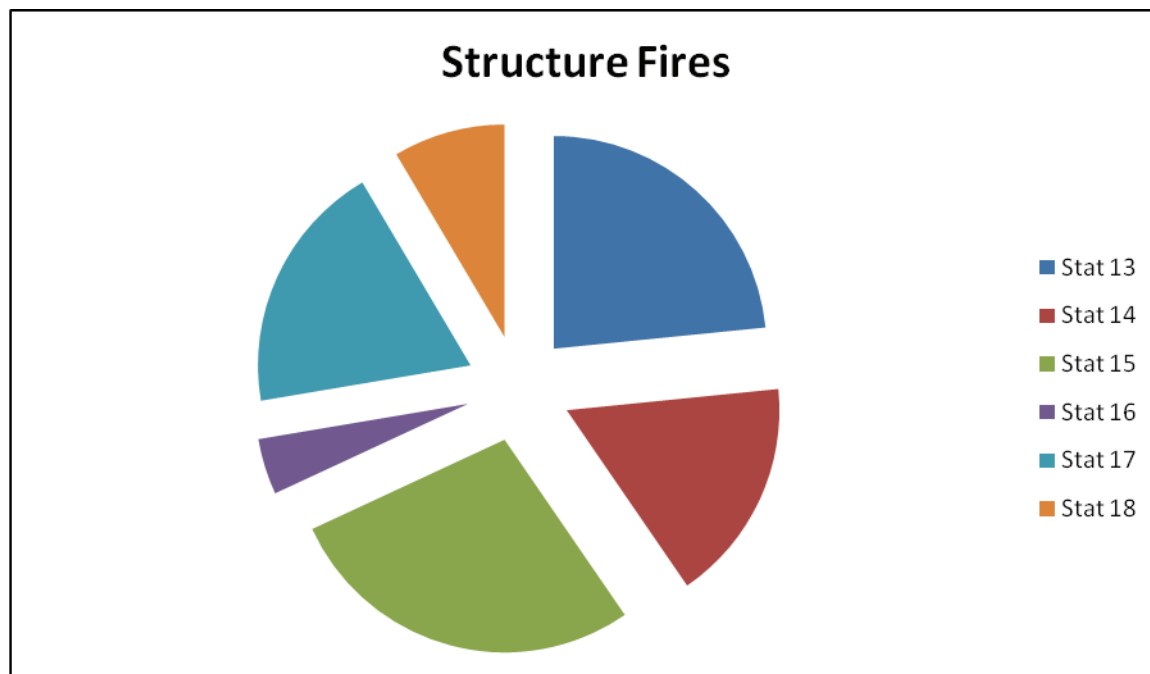


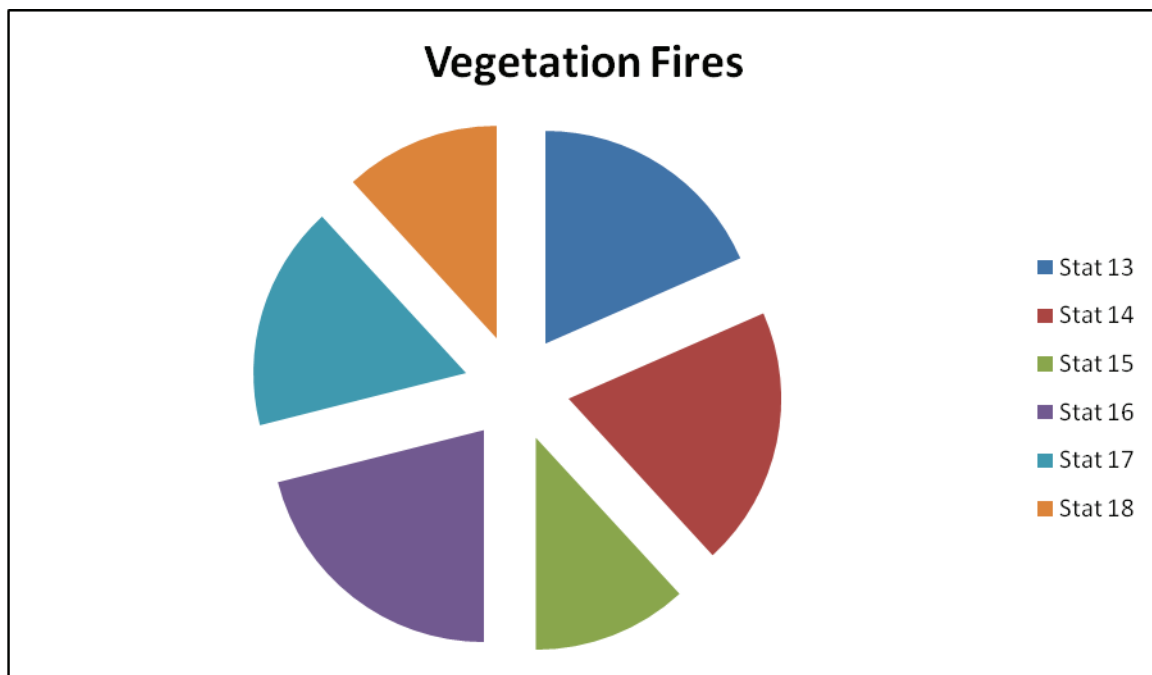
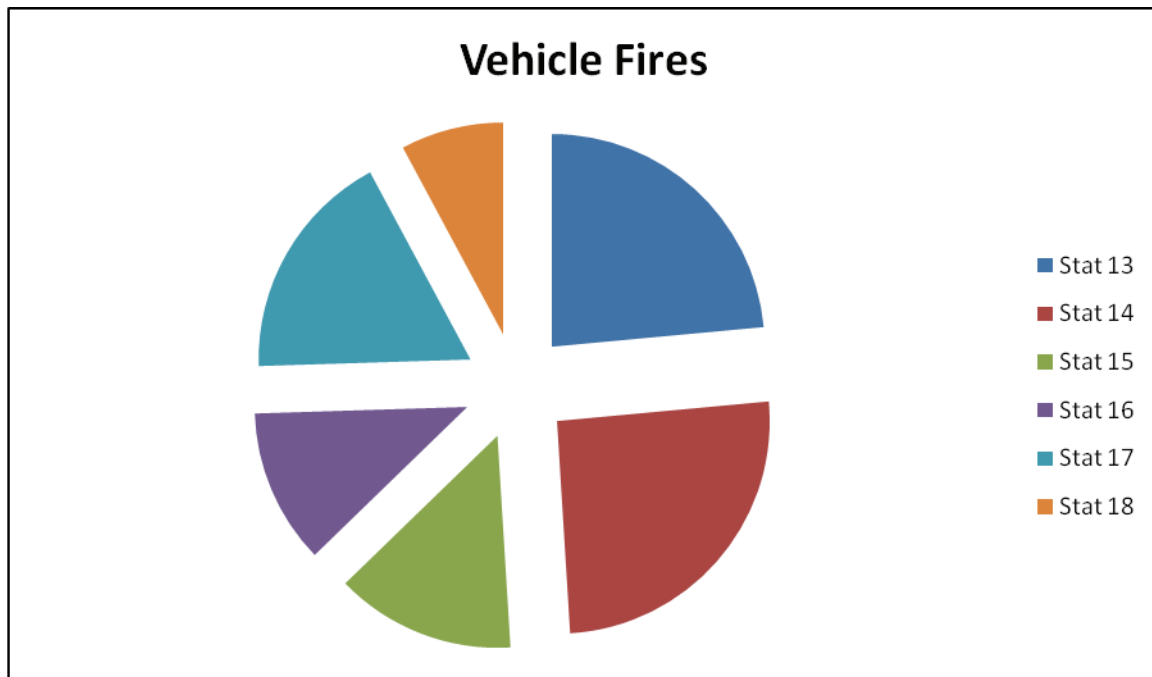


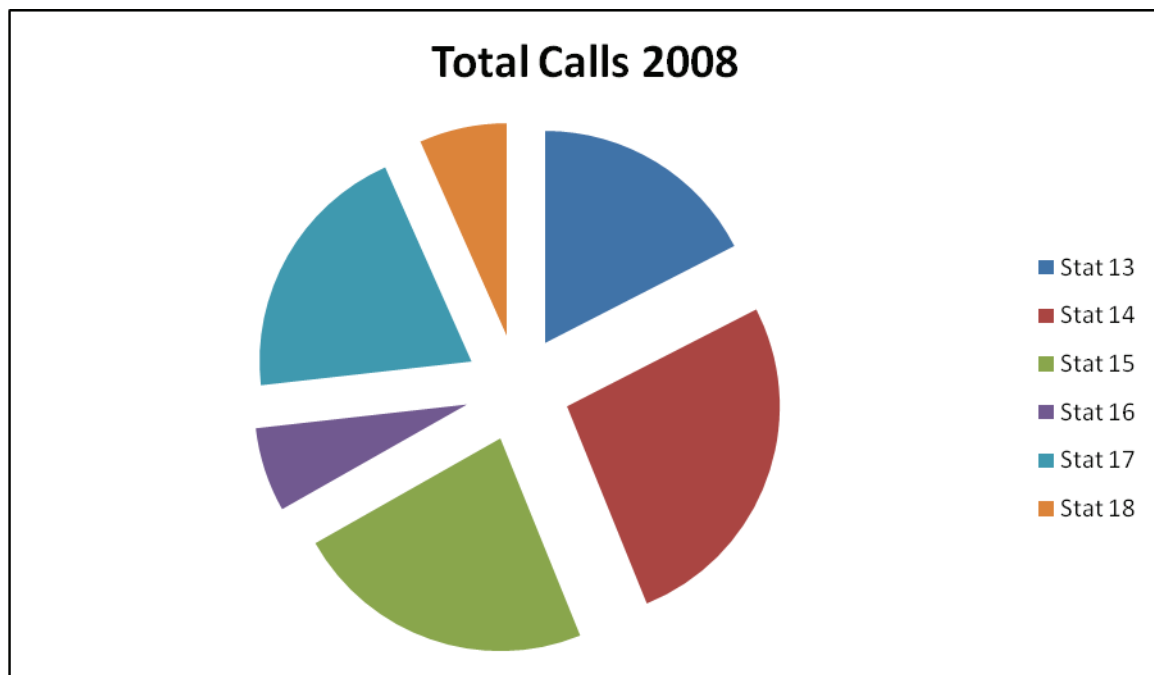
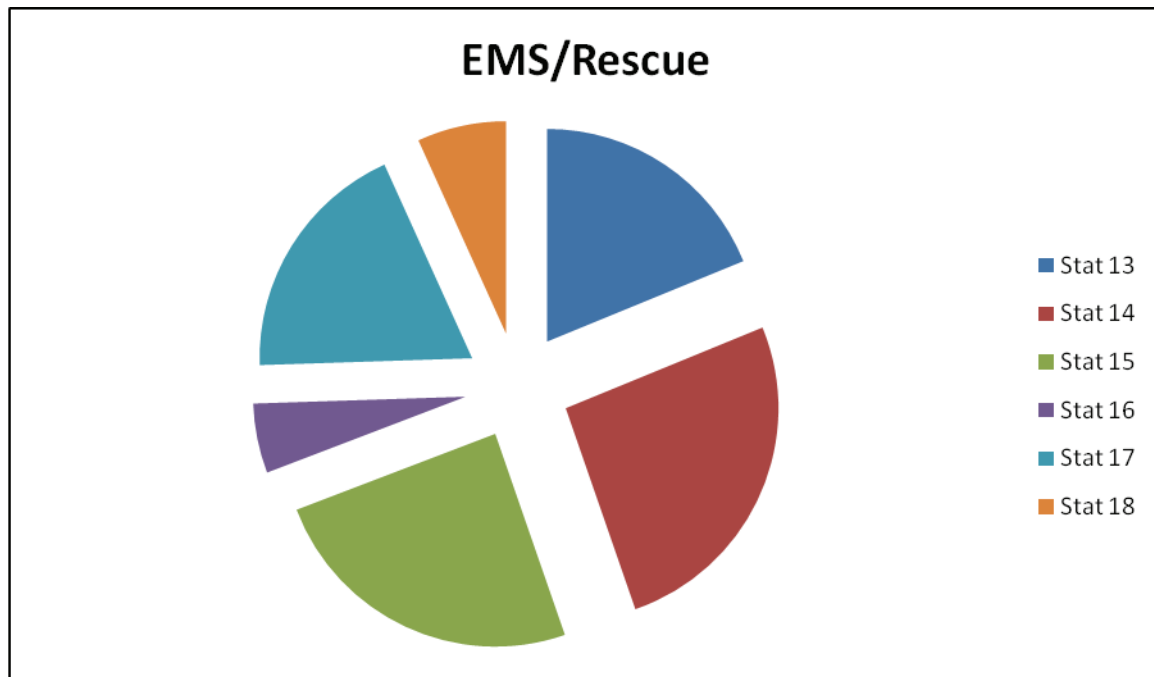
Truckee Meadows Fire Protection District

Emergency Response 2008

Incident Type	Stat 13	Stat 14	Stat 15	Stat 16	Stat 17	Stat 18
Structure Fire	22	16	26	4	18	8
Vehicle Fire	12	13	7	6	9	4
Vegetation Fire	14	15	9	16	13	9
Rubbish Fire	11	10	11	3	7	3
Overpressure	3	8	1	0	1	2
EMS/Rescue	838	1154	1092	236	835	302
Haz Condition	21	30	27	18	19	16
Service Call	43	94	83	27	62	20
Good Intent	138	202	228	91	280	51
False Alarm	69	201	32	14	37	23
Special Incident	0	5	1	0	1	1
Total	1179	1784	1548	433	1359	450



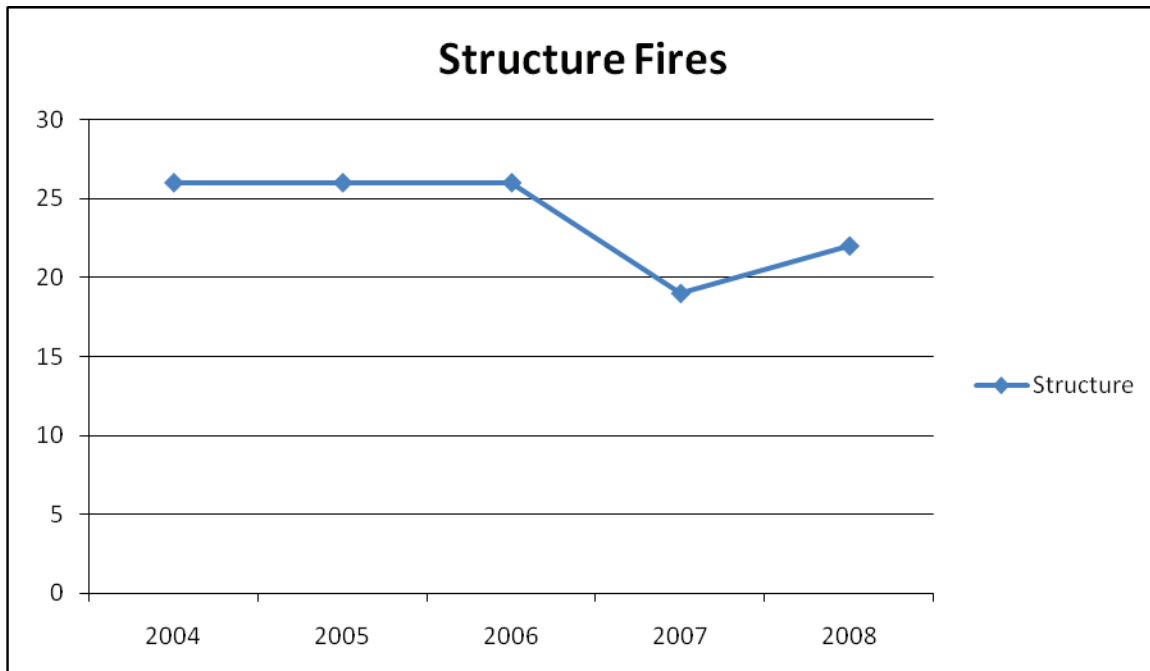


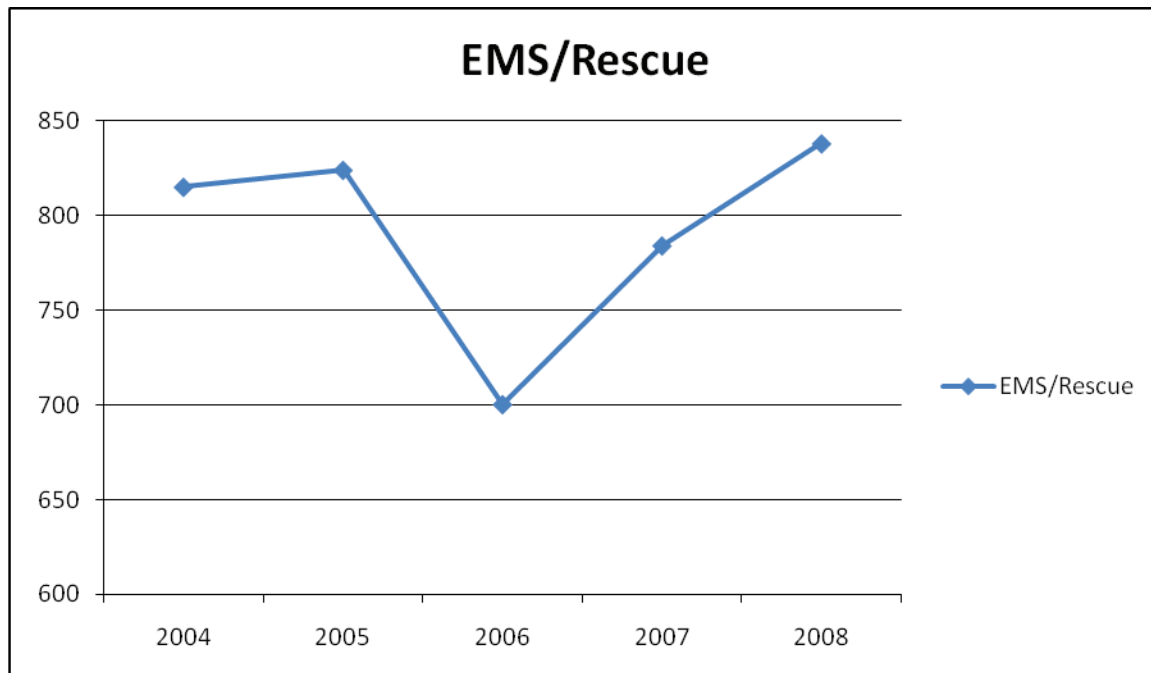
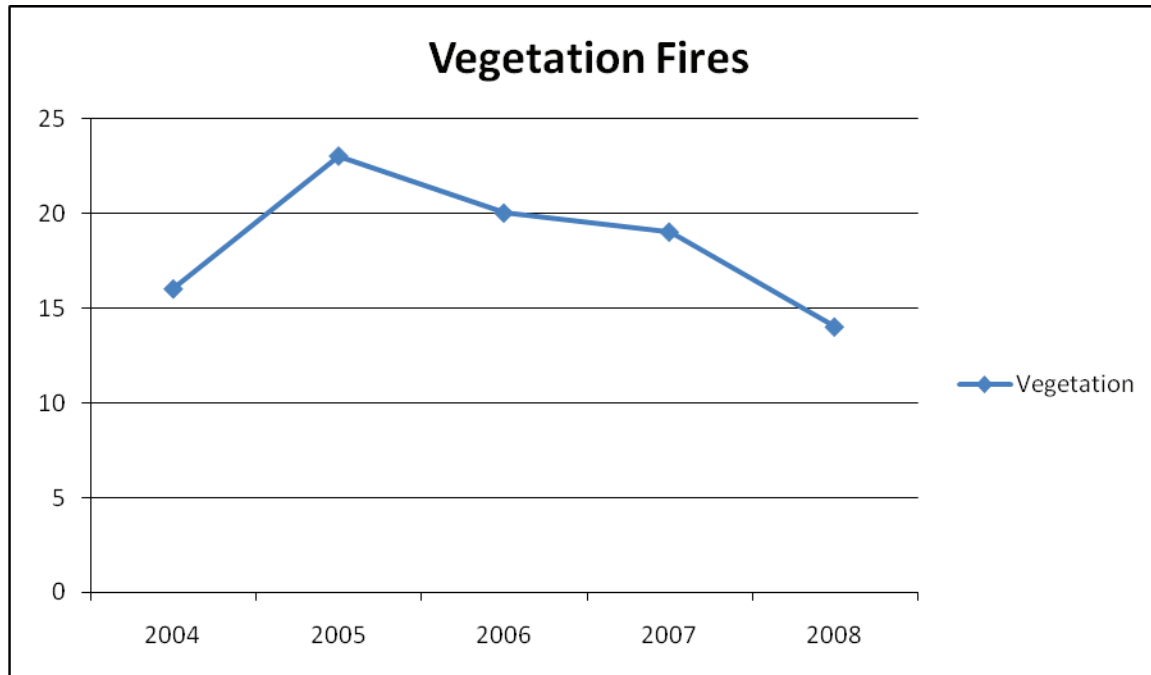


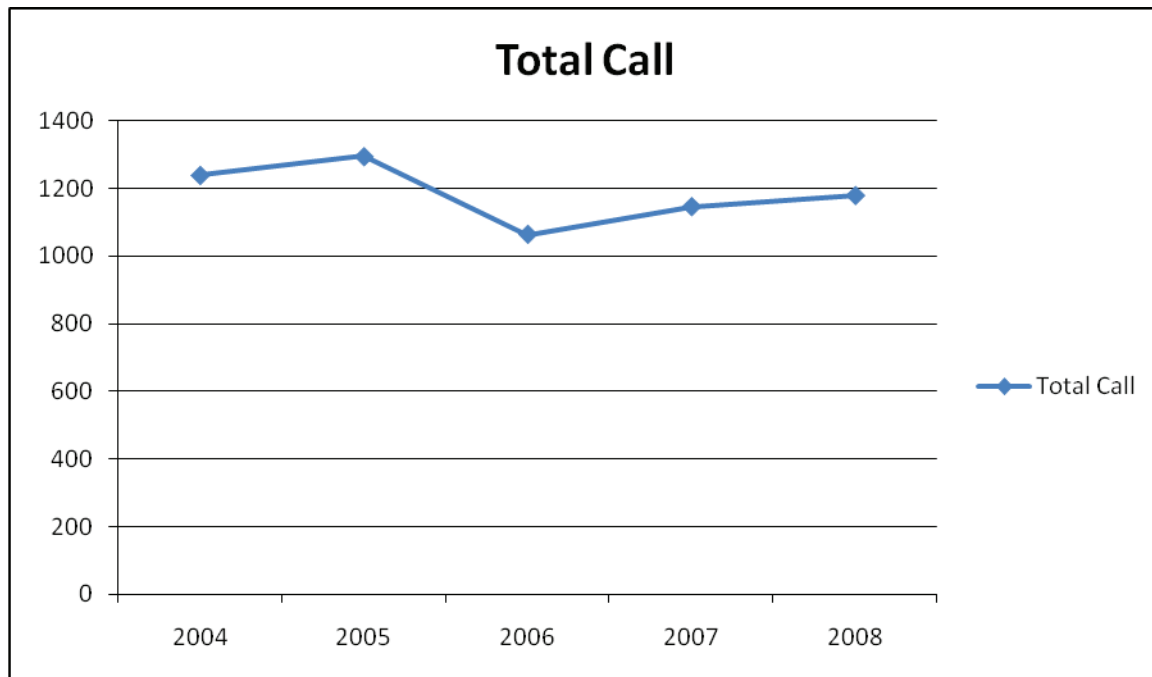
Five Year Analysis of Truckee Meadows Fire Protection District Response

2004-2008

Station 13
1075 Silver Lake Blvd.
Reno, Nevada 89506 (Stead)

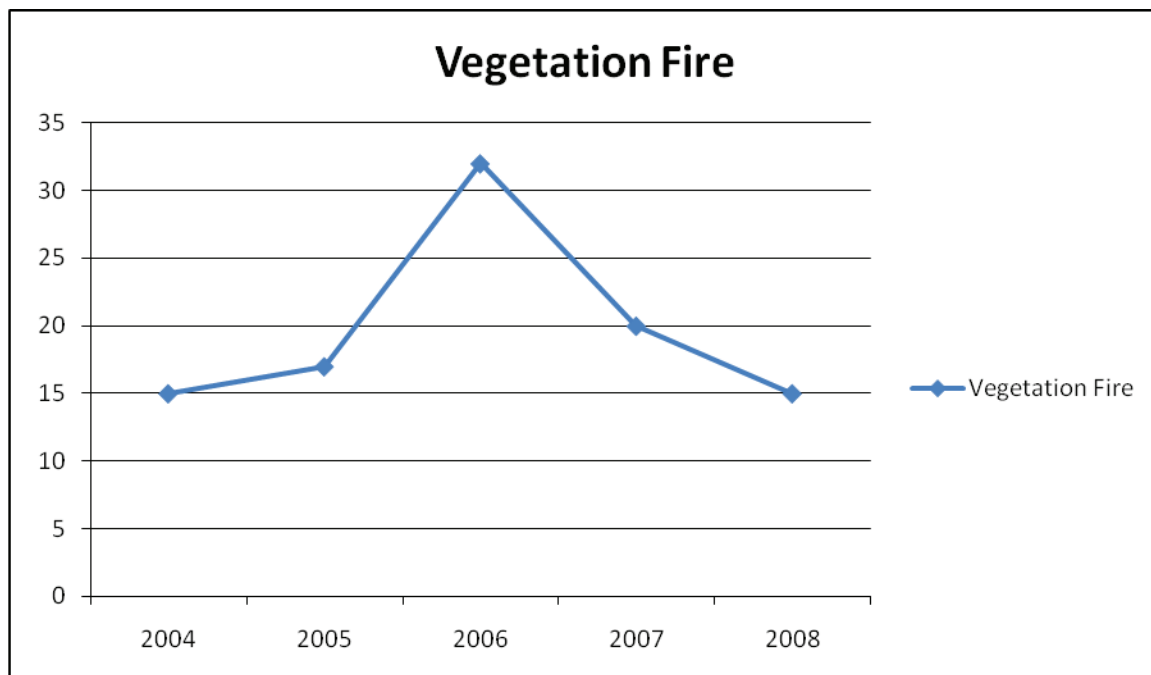
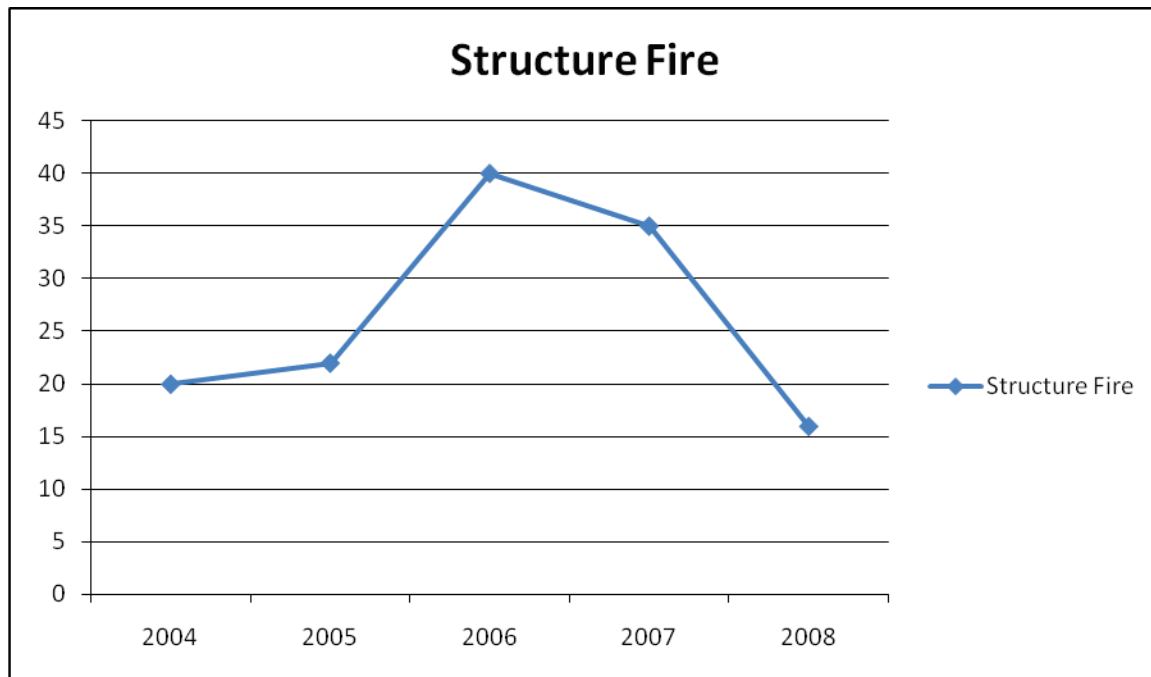


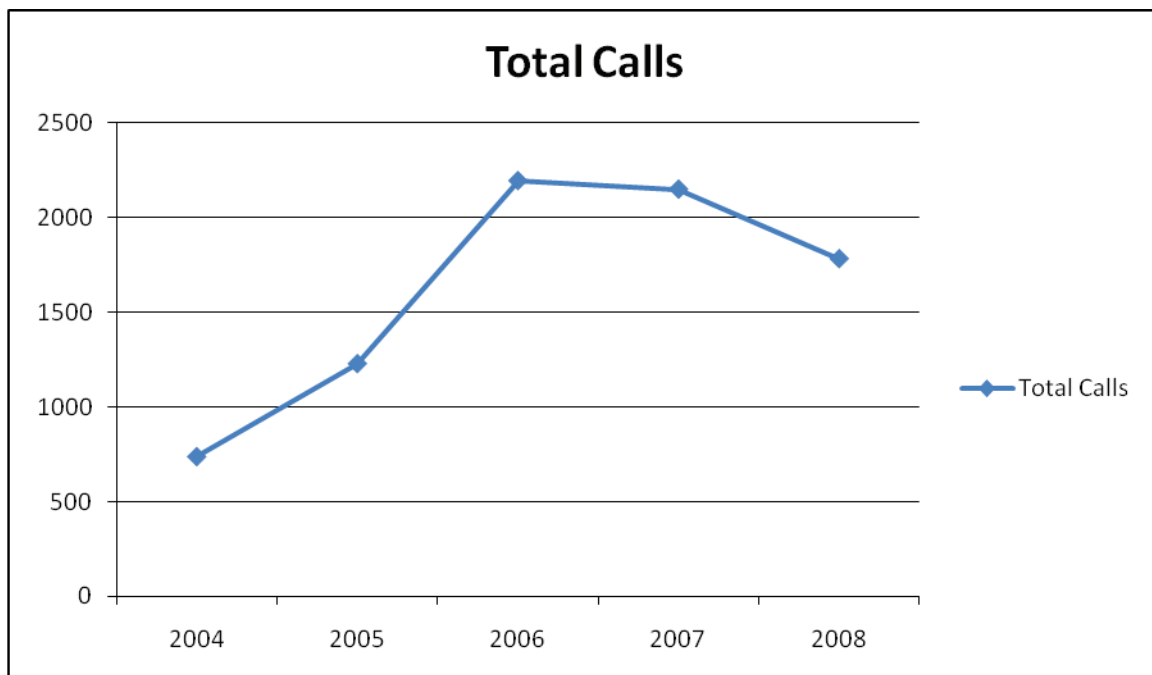
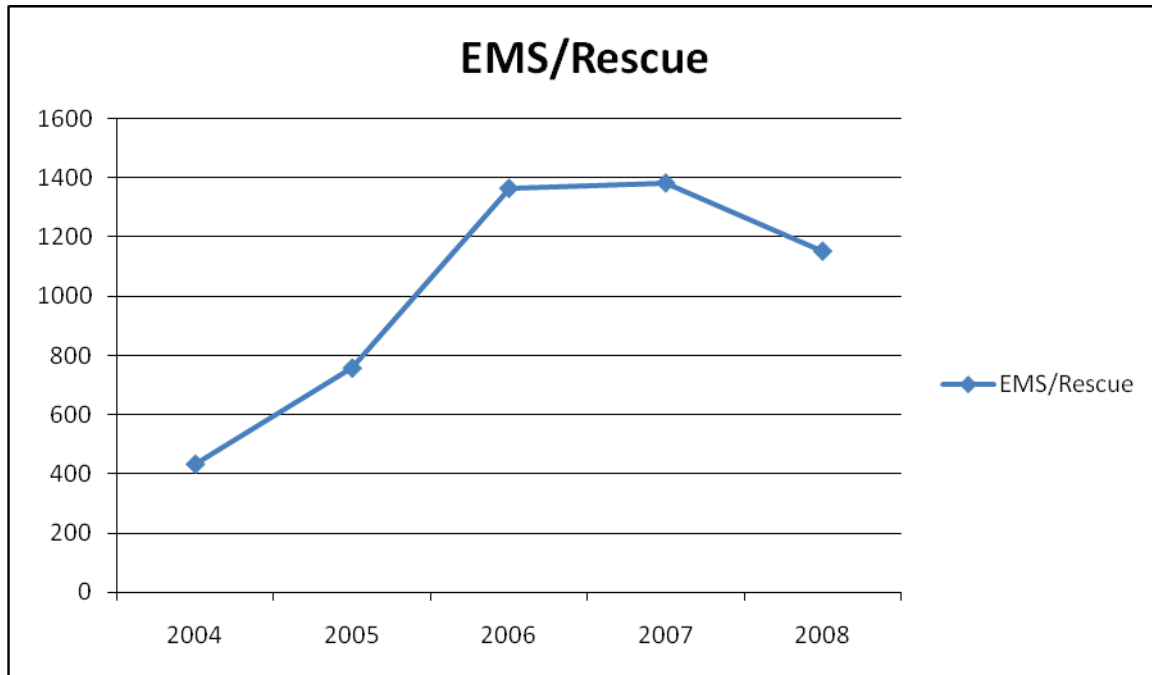




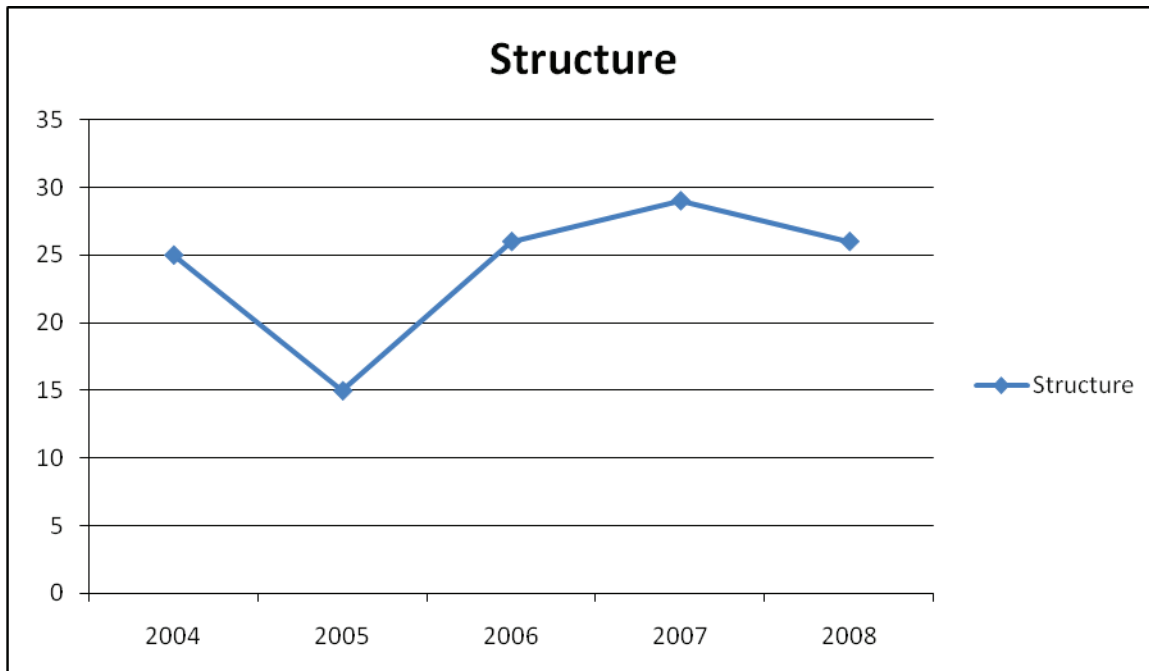
Station 14
12300 Old Virginia Rd
Reno, Nevada 89511

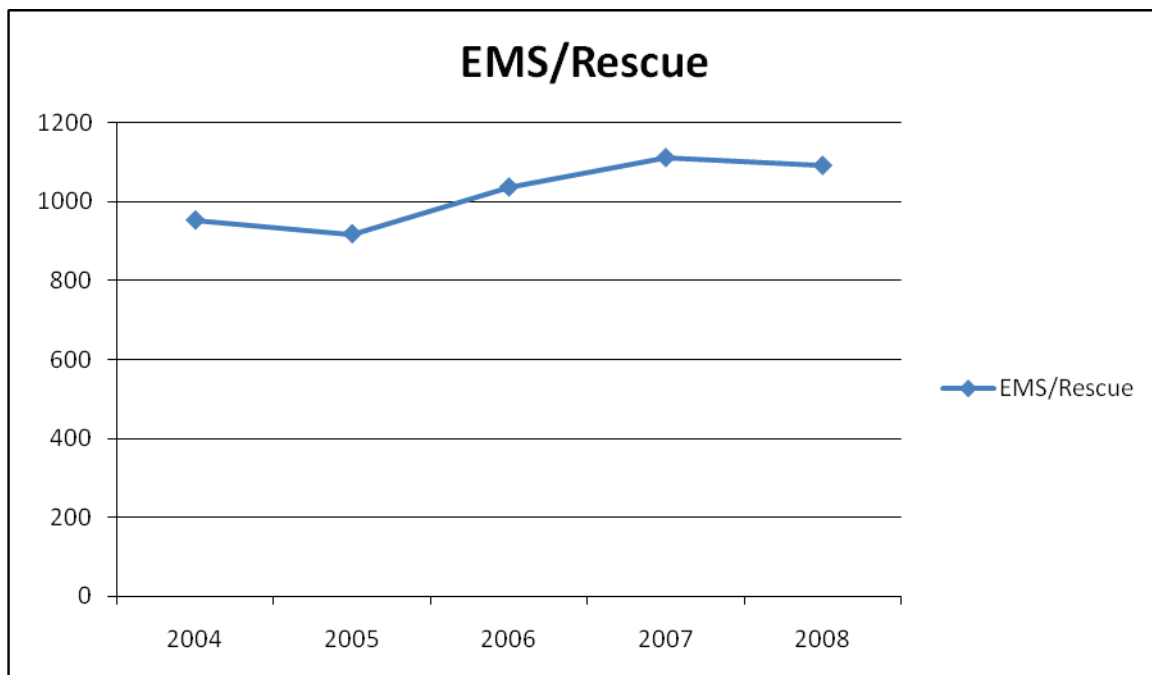
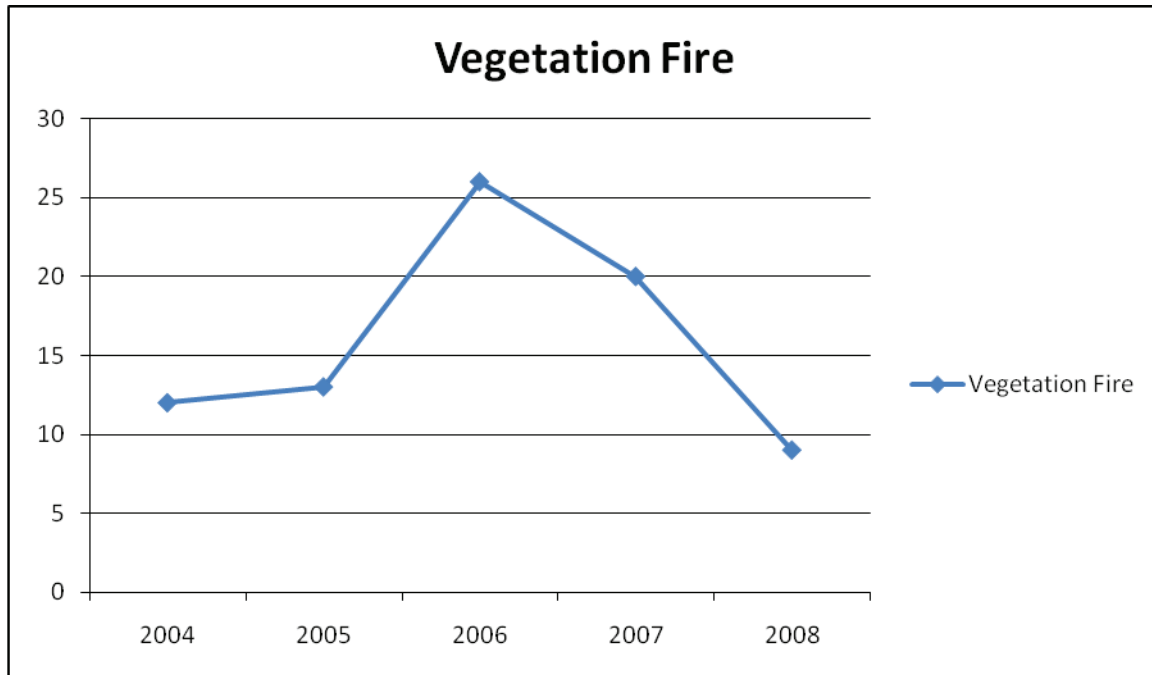


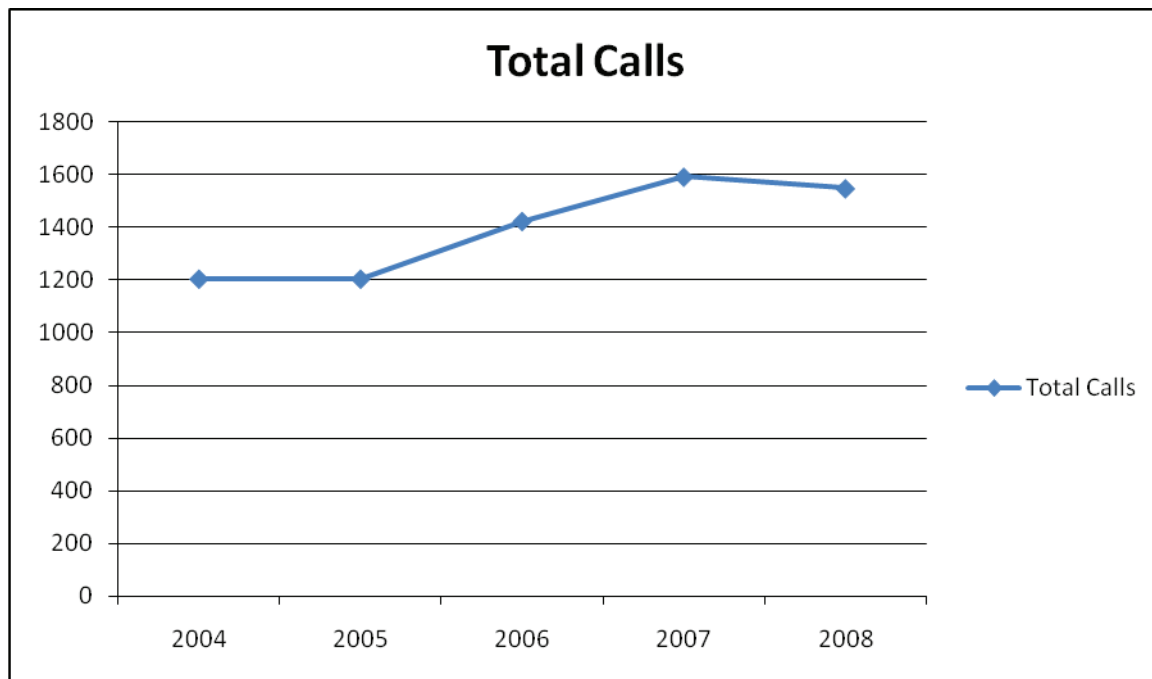




Station 15
110 Quarts Lane
Sun Valley, Nevada 89433

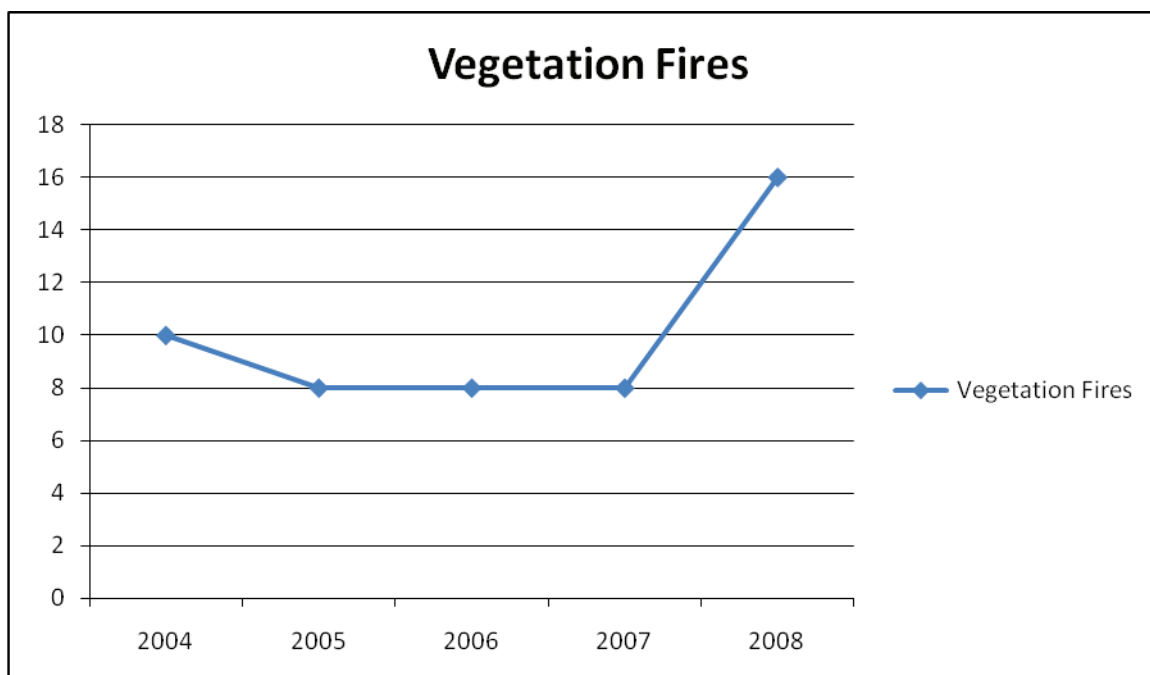
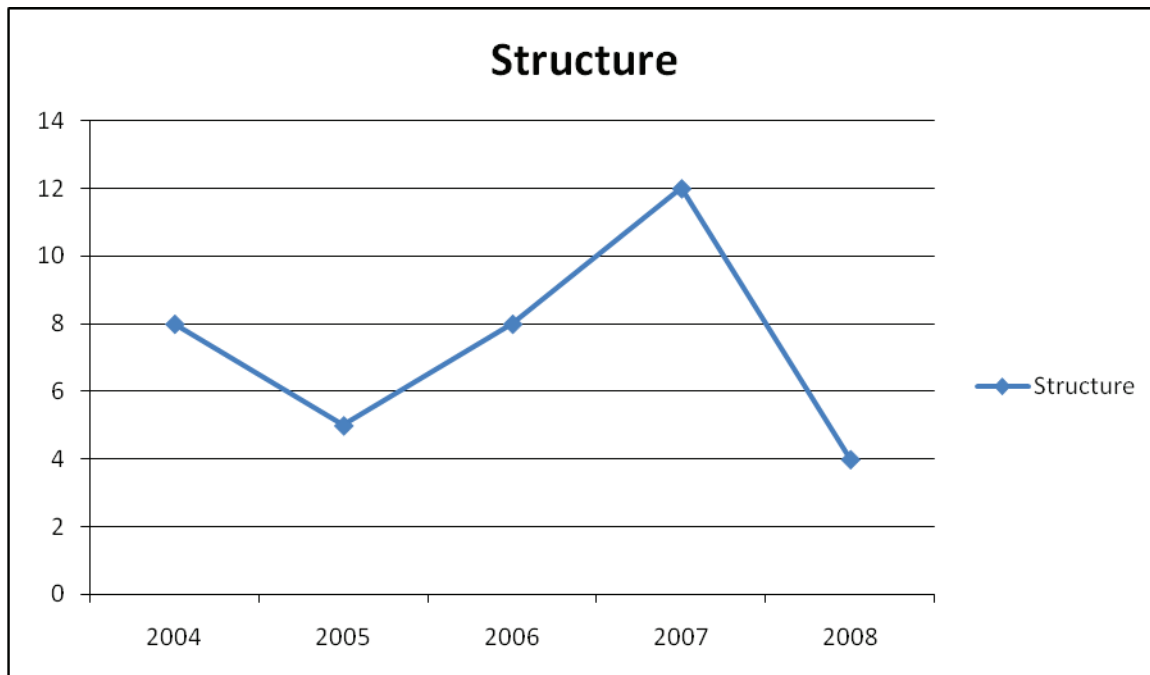


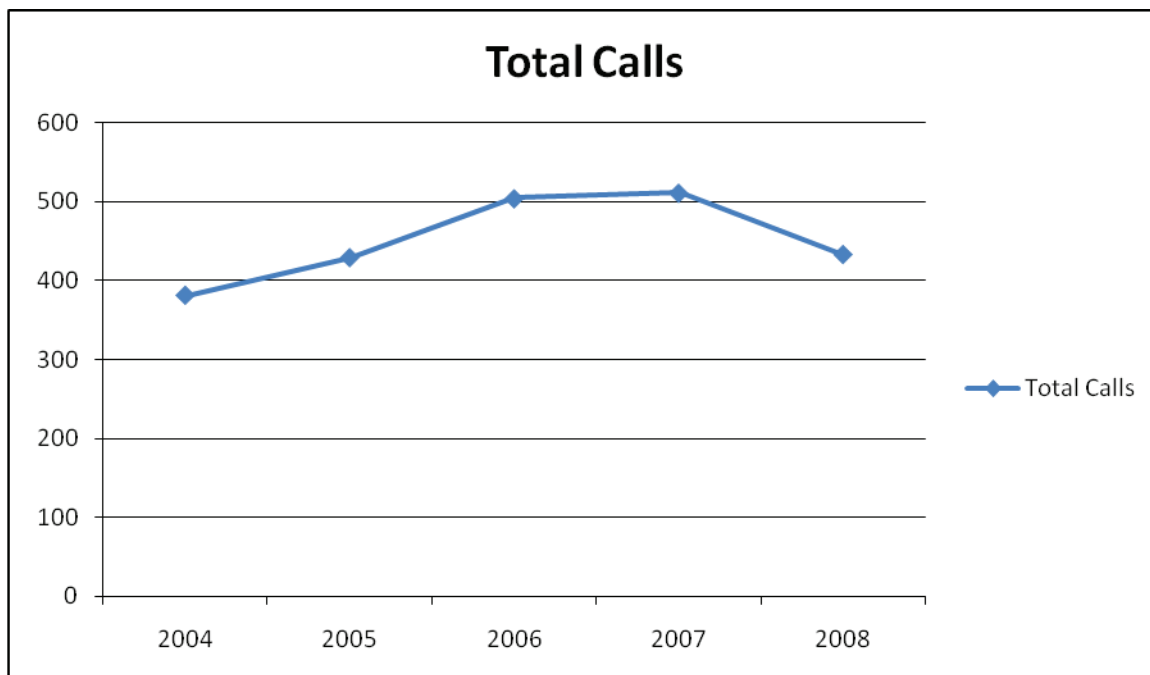
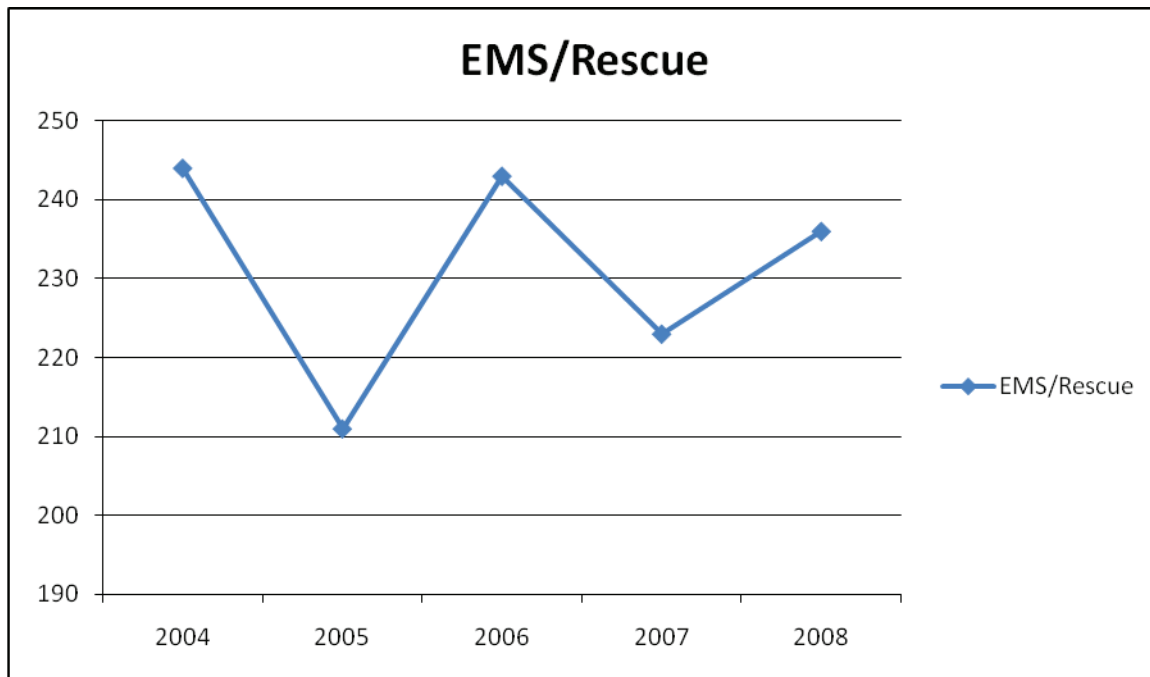




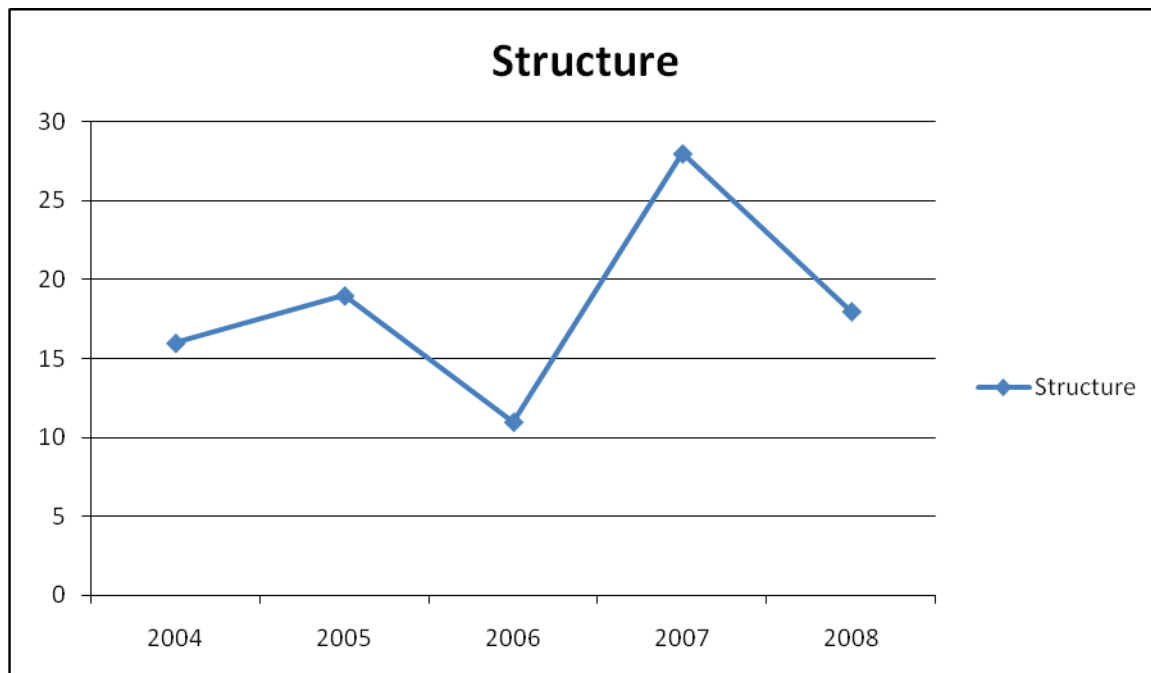
Station 16
1240 East Lake Blvd.
Carson City, Nevada 89704 (Washoe Valley)

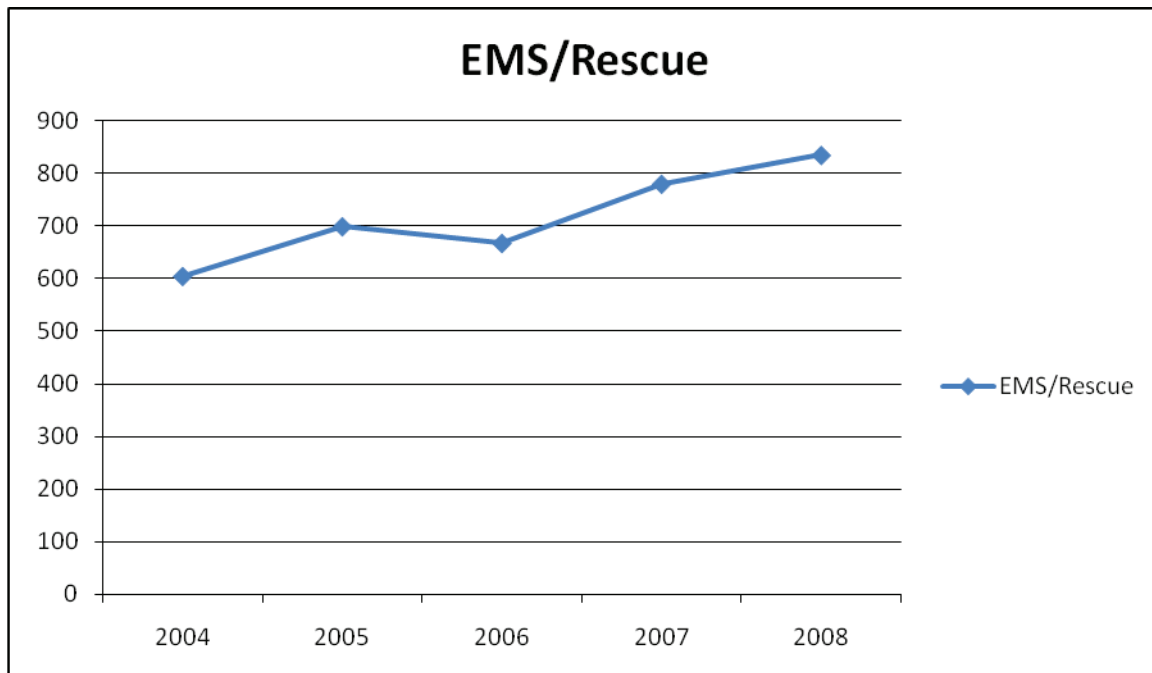
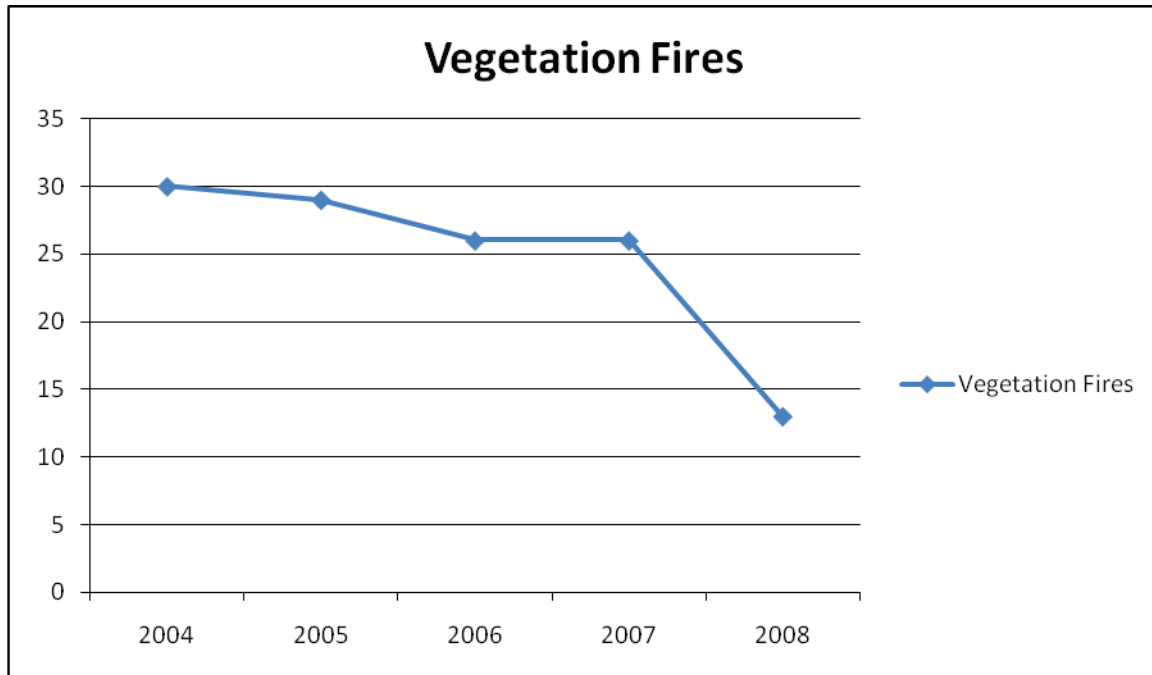


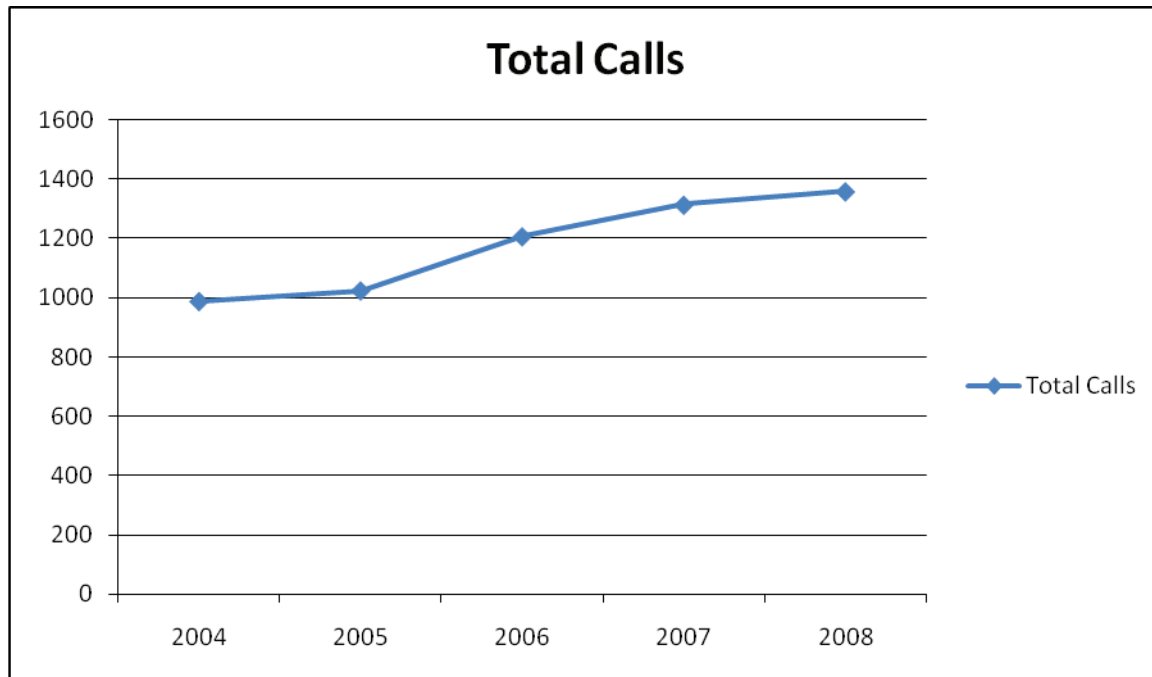




Fire Station 17
500 Rockwell Blvd
Sparks, Nevada 89441 (Spanish Springs)

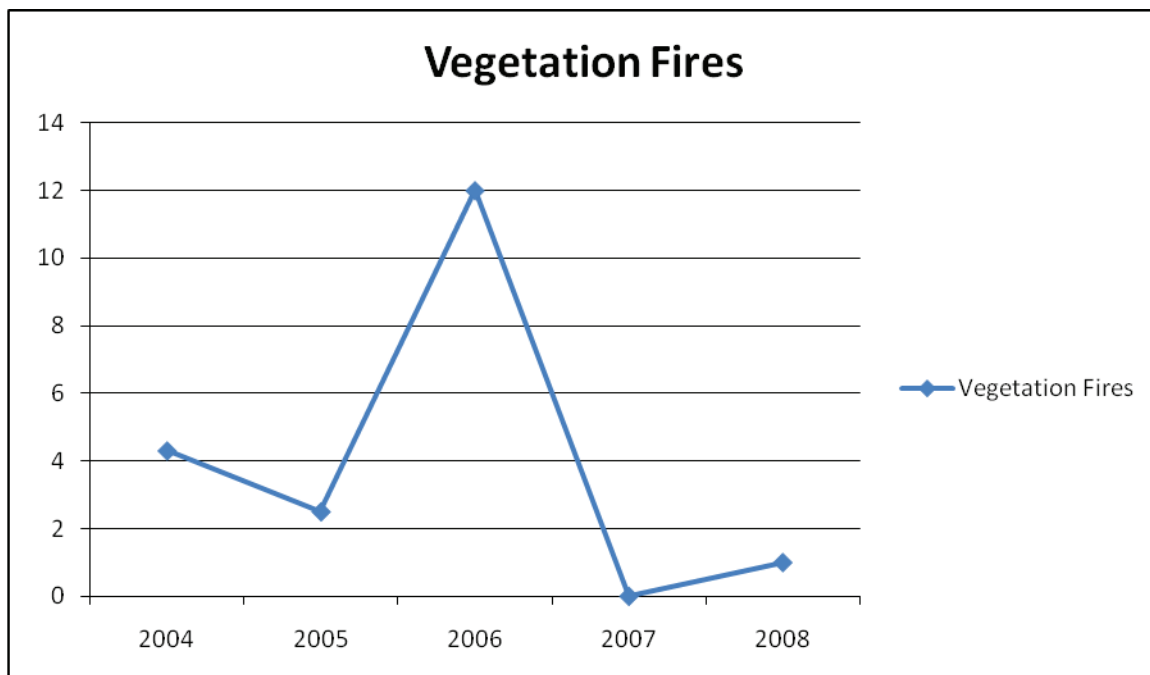
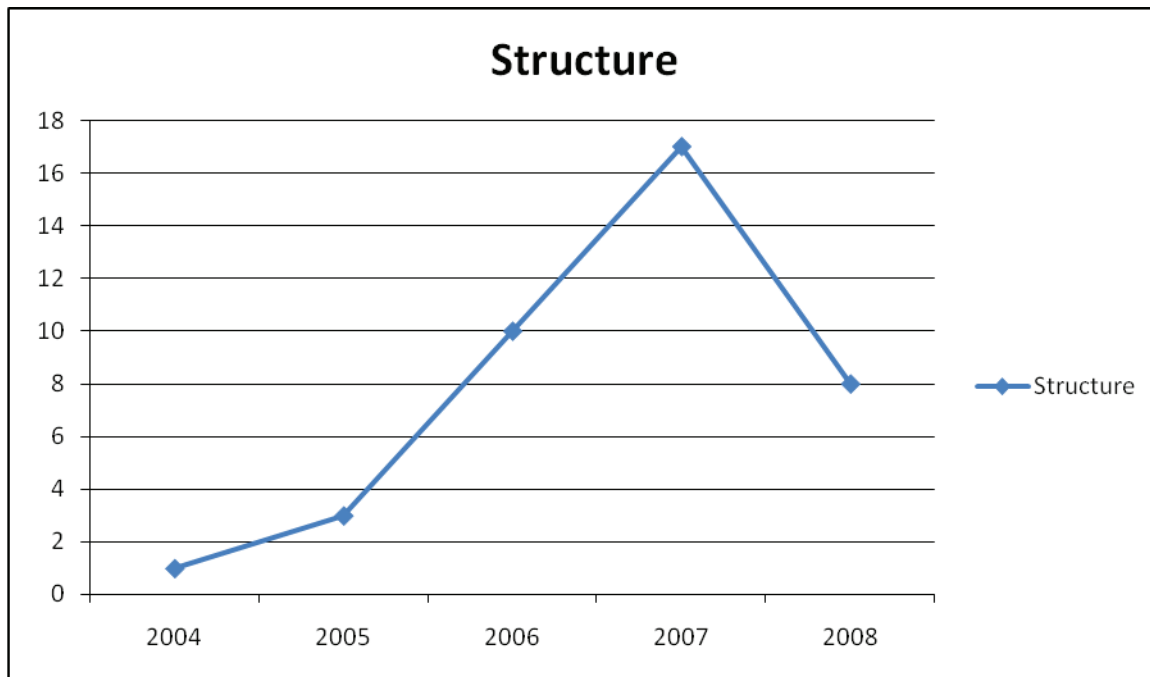






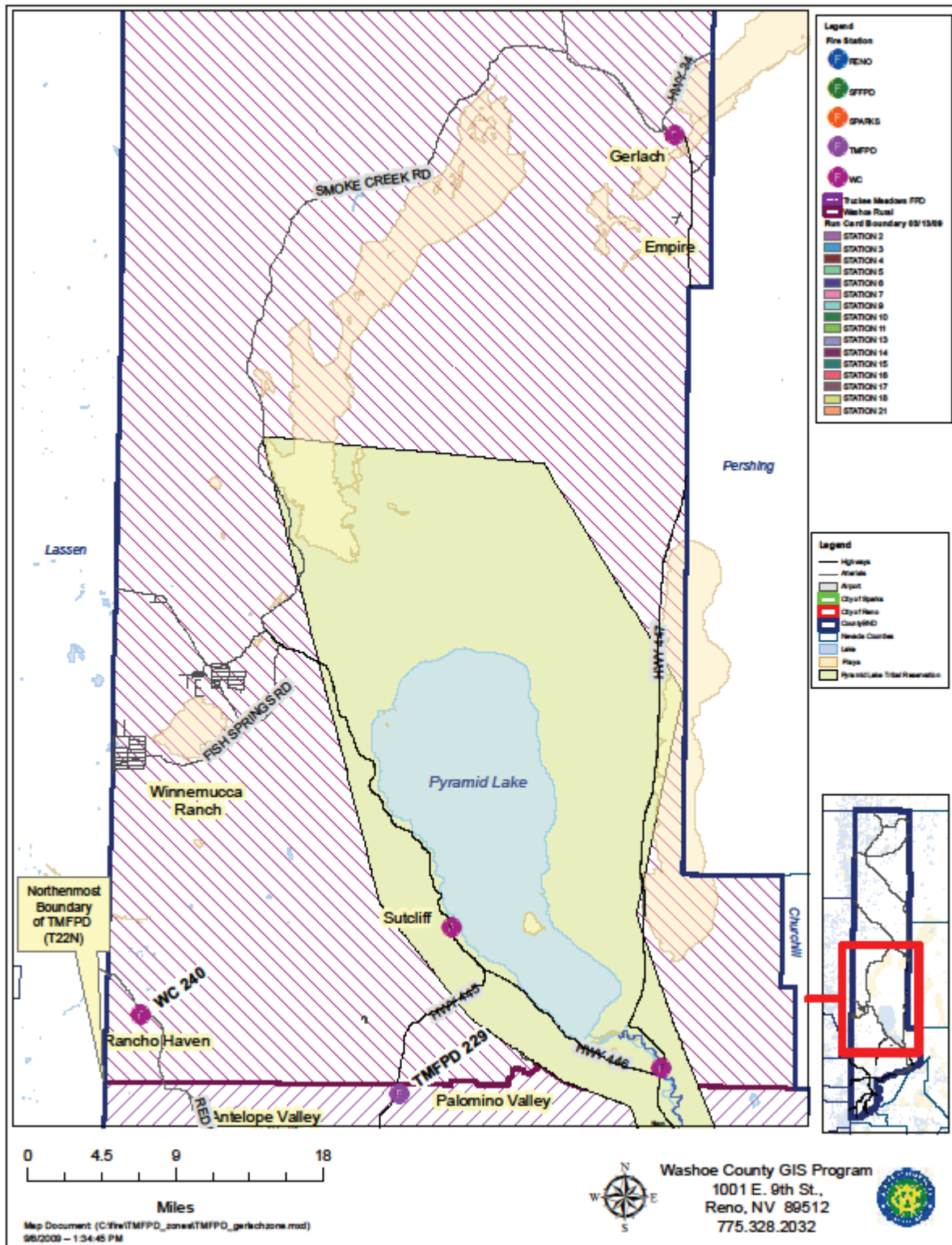
Station 18
3680 Diamond Peak Dr
Reno, Nevada 89506 (Cold Springs)

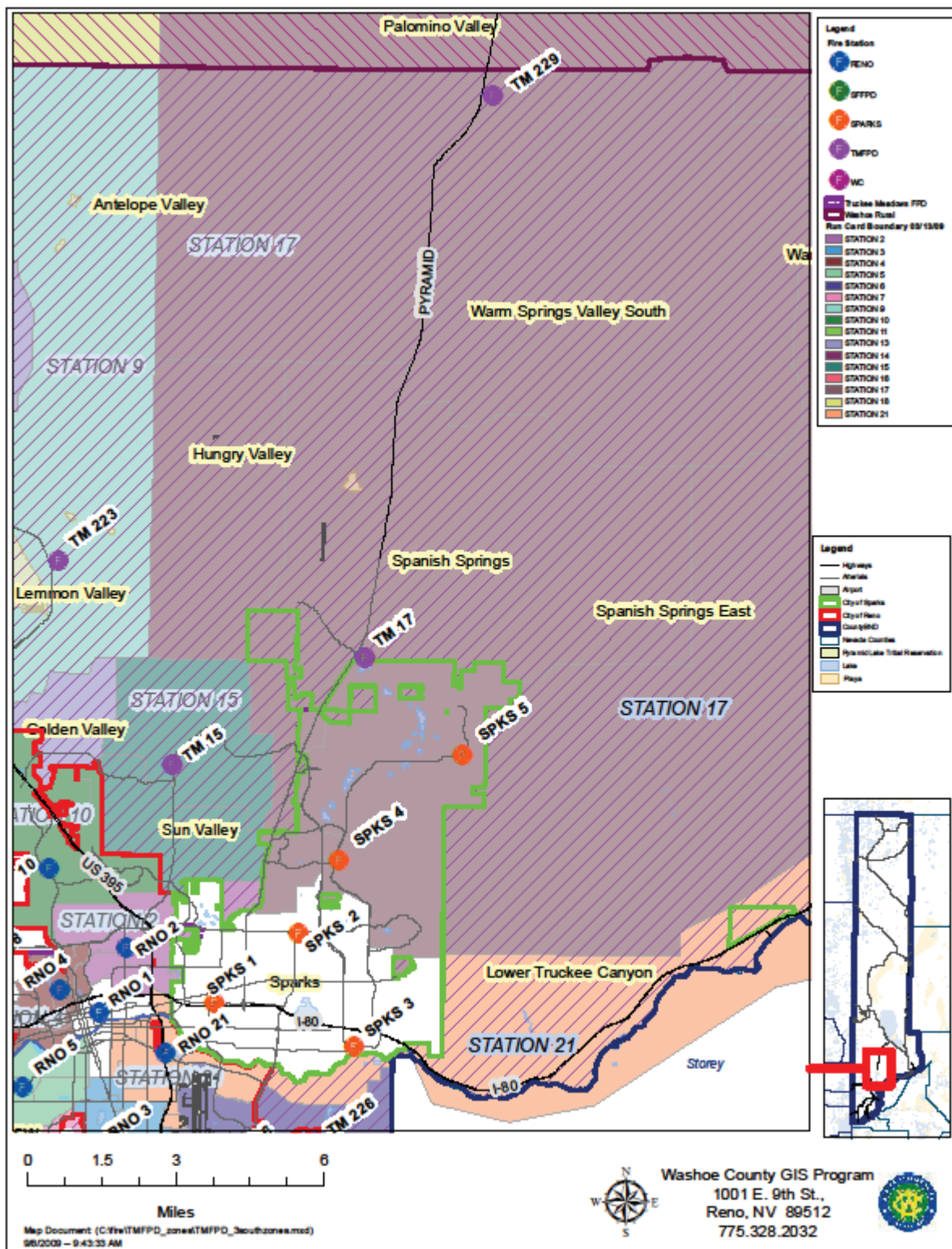


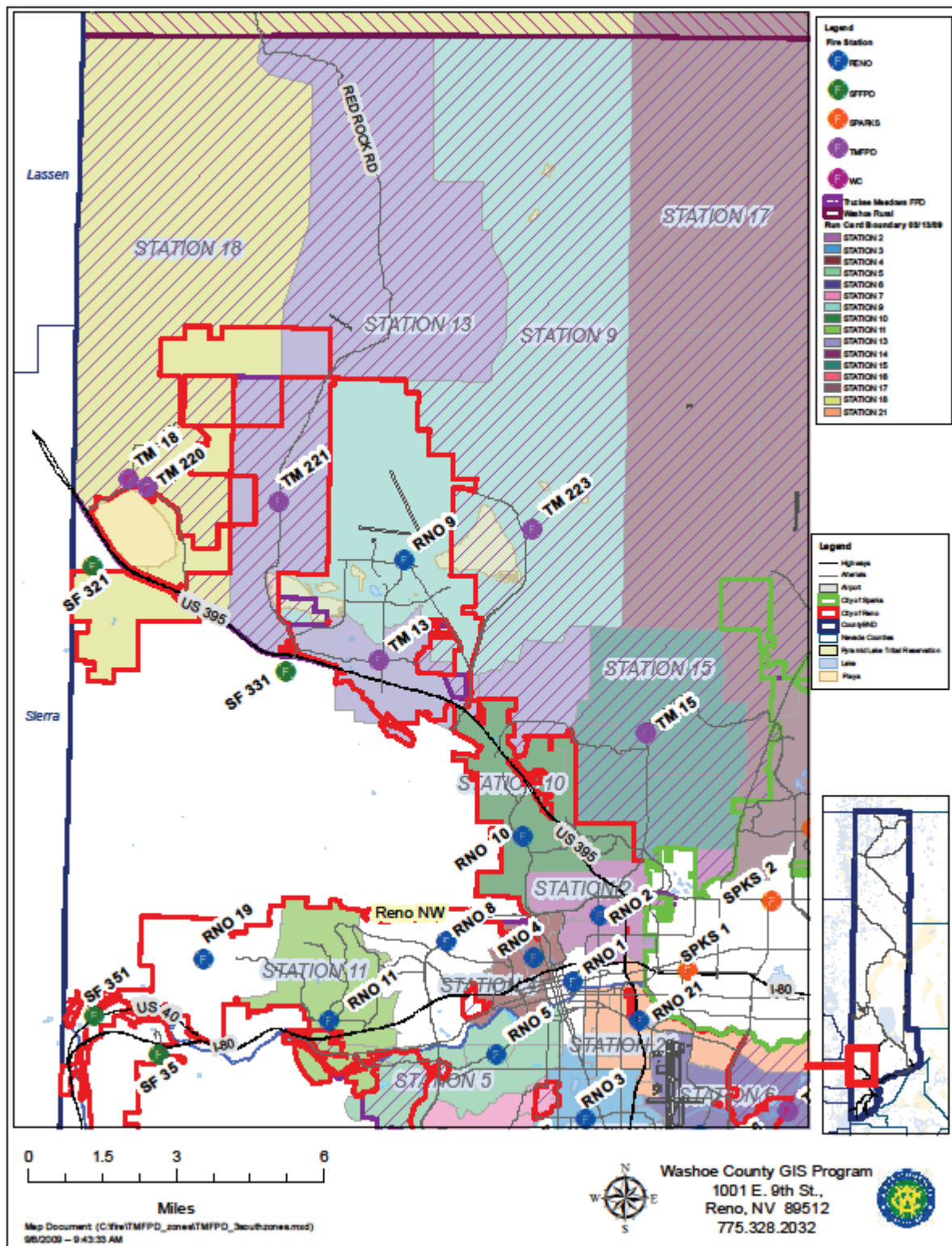


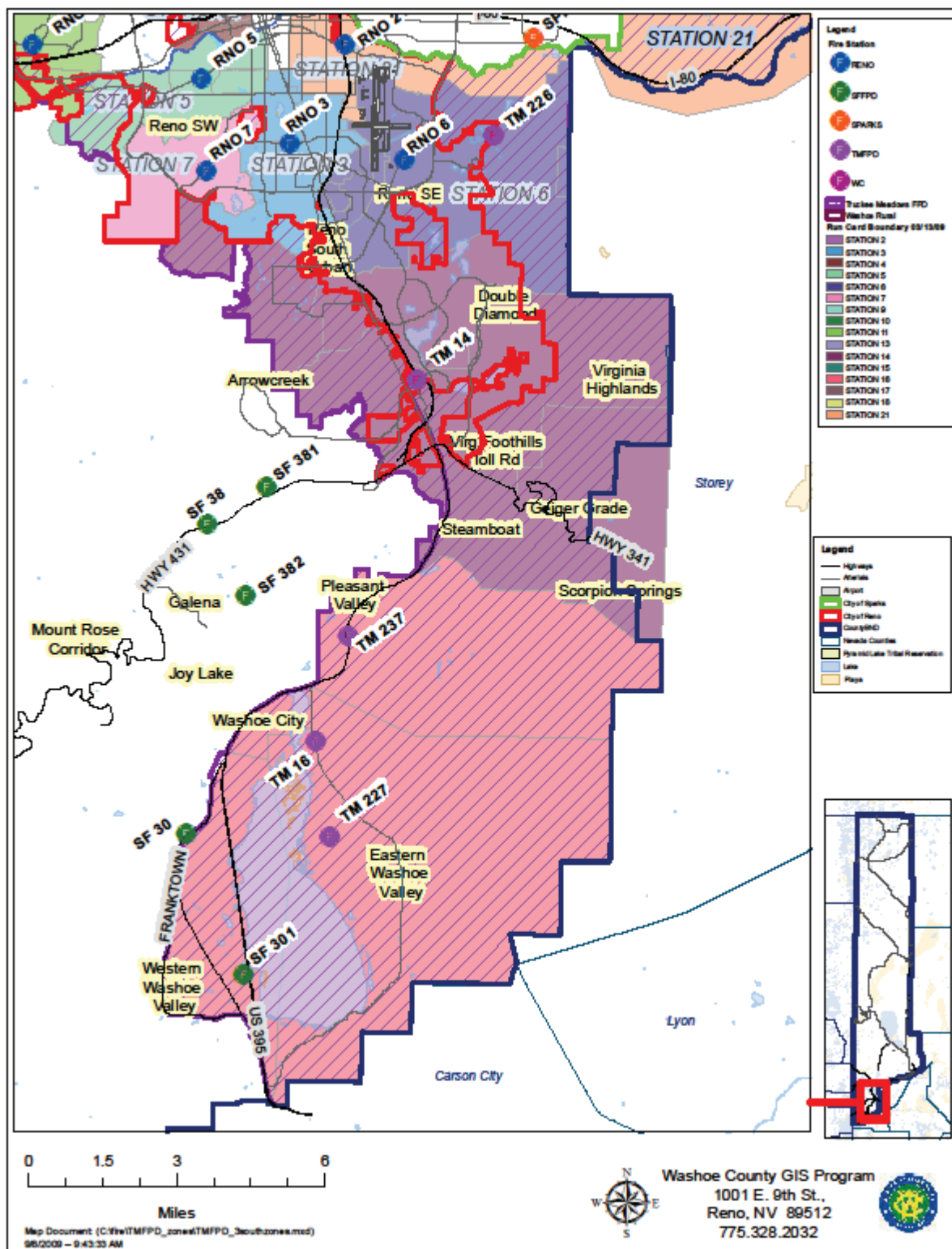
Analysis of Fire Due and Second Due of Stations Serving the Truckee Meadows Fire Protection District

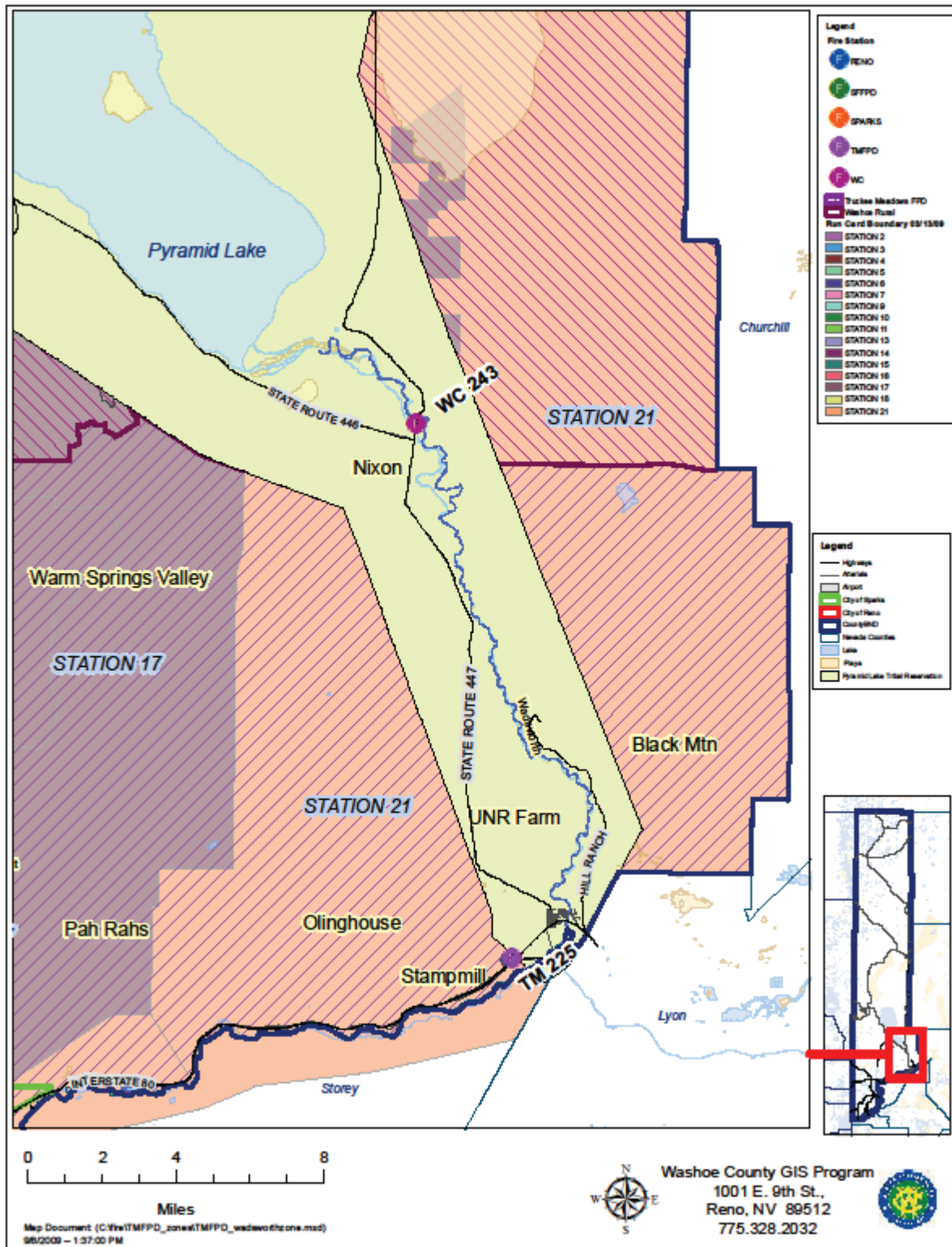
Analysis of First Due and Second Due of Stations Serving the TMFPD 7/1/2008-6/30/2009						
Station	First Due First	%	Second Due First	%	Truck in place of Engine	%
2	8	100.00%	0	0.00%		0.00%
4	31	87.10%	4	12.90%		0.00%
5	46	93.48%	3	6.52%		0.00%
6	344	98.26%	6	1.74%		0.00%
7	3	100.00%	0	0.00%		0.00%
9	344	95.64%	15	4.36%		0.00%
10	20	85.00%	3	15.00%		0.00%
13	235	98.30%	4	1.70%		0.00%
14	564	91.49%	48	8.51%		0.00%
15	1172	98.98%	12	1.02%	43	3.63%
16	249	82.33%	44	17.67%		0.00%
17	687	98.40%	11	1.60%	0	0.00%
18	332	99.10%	3	0.90%		0.00%
21	26	-126.92%	59	226.92%		0.00%
Total	4061	94.78%	212	5.22%	43	1.01%
Analysis of First Due and Second Due of Stations Serving the TMFPD 7/1/2008-10/08/2009						
Station	First Due First	%	Second Due First	%	Truck in place of Engine	%
2	15	86.67%	2	13.33%		0.00%
4	19	78.95%	4	21.05%		0.00%
5	36	94.44%	2	5.56%		0.00%
6	194	99.48%	1	0.52%		0.00%
7	5	100.00%	0	0.00%		0.00%
8	1	100.00%	0	0.00%		0.00%
9	265	96.23%	10	3.77%		0.00%
10	28	85.71%	4	14.29%		0.00%
11	4	50.00%	2	50.00%		0.00%
13	280	98.21%	5	1.79%		0.00%
14	730	91.64%	61	8.36%		0.00%
15	1497	98.46%	23	1.54%	47	3.09%
16	323	85.14%	48	14.86%		0.00%
17	916	97.82%	20	2.18%	2	0.21%
18	416	98.56%	6	1.44%		0.00%
21	42	-80.95%	76	180.95%		0.00%
Total	4771	94.47%	264	5.53%	49	0.97%











Emergency Medical Service Delivery

Emergency medical services are provided by responders classified as First Responder and Emergency Medical Technicians (EMT's). All career departments in the County are staffed with EMTs. There are three levels or classifications of EMT's: EMT Basic, EMT Intermediate, and EMT Paramedic. The training for an EMT Basic is 160 hours, an EMT-Intermediate is an additional 100 hours and an EMT-Paramedic is 1,800 hours, which includes a clinical internship at a hospital. The EMT-B is certified to provide basic life support including splinting and bandaging. The EMT-I is certified to provide basic life support plus provide additional airway procedures, place IVs and administer several medications.

The City of Reno and TMFPD fire engines are staffed with EMT-B and EMT-I personnel. The City of Reno and TMFPD has a Medical Director who also serves as an Emergency Room Physician. The City of Reno and TMFPD has a Battalion Chief who serves at the Emergency Medical Services Coordinator.

The Regional Emergency Medical Service (REMSA) has an exclusive transport franchise for Washoe County excluding the North Lake Tahoe Fire Protection District and Gerlach area. The North Lake Tahoe Fire Protection District (NLTFPD) and Gerlach have ambulances and patient transport. The NLTFFPD provides paramedic service with cross trained firefighter/paramedics.

The fire department is part of a tiered Emergency Medical System. The premise is to send the closest medically trained response unit to the scene of a life threatening medical emergency to provide the quickest intervention, the highest chance of survival and recovery. This is critical in emergencies resulting in those with compromised breathing or circulatory systems. Trauma, strokes, heart attack, allergic reactions, and choking are all emergencies that require the rapid intervention of the closest units. If any of these conditions lead to heart attack or shock, failure to provide rapid treatment within 4-6 minutes could lead to irreversible brain damage and most likely death. Rapid defibrillation in the case of a heart attack, as well as, oxygen therapy provides the heart attack and stroke patient with the best chance of survival.

The fire department provides the first tier of emergency medical treatment . All units are staffed with a minimum of Emergency Medical Technician (EMT) Basic Level personnel and defibrillation capability with 14 of 18 stations staffed to an EMT Intermediate level. The EMT Intermediate level personnel perform all of the Basic Skills and can intubate to establish an airway, as well as, provide some drug therapy. The EMT intermediate level is required by Interlocal agreement in the Truckee Meadows Fire Protection District Areas administered by the Reno Fire Department. The fire department is the exclusive provider of extrication and disentanglement for trapped victims. The ambulance provider is the next tier of the system. They provide advance drug therapy and some invasive procedures, as well as transport patients to the hospital. The ambulance provider does not extricate, disentangle, or provide physical rescue to trapped patients.

Together, the tiers provide a network for the patient regardless of who arrives on scene first. Often times the patient has the best chance of survival when all of the responders work together on the scene. With patients with life threatening conditions, care is transferred immediately upon arrival of the upper tier (ambulance) from the EMTs to the Paramedics. On incidents where the fire department is on scene first, the patient is stabilized by the EMTs and packaged to minimize the on scene time when

¹ The Fire Department responds only for life threatening emergencies, known as priority 1 and 2. All non-life threatening conditions and transports are done by the ambulance provider.

the next tier (ambulance) arrives. This aspect is critical in some patients and a minimal scene time with rapid transport is critical for survival.

The question of duplication of services when applied to the emergency medical system is one that requires a look at the frequency of simultaneous arrival of the provider or who arrives first, and the desired outcome. If the frequency of the higher tier arriving first or the simultaneous arrival of providers is in the 90th percentile then a case could be made that the service may be duplicative and not complementary. That is unless an individual was in that 10 percent and could have survived by intervention by the lower tier and it was not available because the decision was made to eliminate that level of response. This is fortunately not the case. In an analysis of arrival of the two tiers at the scene of an emergency medical incident for FY 03-04 through current FY 07/08. The results are as follows:

- The City Core Area – Defined as the all areas inside the McCarran Ring Road

	FY 03/04	FY 04/05	FY 05/06	FY 06/07	FY 07/08*
Percentage of Fire on scene first	66%	70%	80%	78%	56%
Percentage of REMSA on scene First	34%	30%	20%	22%	44%

*** Denotes FY 07/08 YTD as of May 19, 2008**

- The Outlying Areas – All City areas outside of the McCarran Ring Road including all areas in the Truckee Meadows Fire Protection District

	FY 03/04	FY 04/05	FY 05/06	FY 06/07	FY 07/08*
Percentage of Fire on scene first	76%	79%	83%	81%	70%
Percentage of REMSA on scene First	24%	21%	17%	19%	30%

***Denotes FY 07/08 YTD as of May 19, 2008**

These figures are based on reporting codes in the Fire Department records management system. An analysis of how close the arrivals of two levels are will require a substantial time commitment. Arrival time records from both RFD and REMSA will have to be compared incident by incident to get that information.

In the analysis, it showed that areas that REMSA stations their ambulances received the highest frequency of calls where REMSA arrived first. The Downtown core was one of the highest due in large to the proximity of the two Hospitals where REMSA Units spend a great deal of time.

Call Volumes in the core are much higher that they are in the outlying areas. This is reflected in the numbers. While the REMSA arrival first percentage is higher in these areas, the number of total EMS Calls are higher as well resulting an very high workload and need in these areas.

Stations	FY 04/05		FY 05/06		FY 06/07		FY 07/08*	
	EMS Calls	% of all calls	EMS Calls	% of all calls	EMS Calls	% of all calls	EMS Calls	% of all calls
1	4029	67%	4900	69%	5750	69%	5136	73%
2	2020	75%	2059	71%	2604	76%	2383	78%
3	2582	63%	2760	61%	3230	64%	2825	61%
4	1455	64%	1537	62%	1566	53%	1835	66%
5	488	58%	571	61%	627	61%	681	65%
6	1111	66%	1085	58%	1364	61%	1201	63%
7	235	64%	247	58%	262	55%	215	51%
8	1002	71%	1092	70%	1297	67%	1178	68%
9	590	76%	623	80%	697	76%	586	72%
10	474	60%	542	58%	591	58%	567	59%
11	400	57%	469	57%	539	57%	390	51%
12	453	68%	206	69%	52	48%	43	58%
13	1021	78%	708	64%	739	64%	692	65%
14	505	67%	897	46%	978	44%	1063	55%
15	863	73%	971	71%	1019	68%	786	55%
16	392	95%	376	80%	485	92%	349	79%
17	711	68%	600	55%	651	50%	688	68%
18	8	90%	211	70%	351	70%	318	68%
19	25	39%	45	23%	67	25%	79	53%
Total	18364	68%	20069	62%	23118	60%	21275	68%

***Denotes FY 07/08 YTD as of May 19, 2008**

Yellow denotes Truckee Meadows Fire Stations

The response numbers would be very different if the entry into the EMS system was more efficient. Currently, when a person dials 911, a call taker at the Regional Dispatch center asks if they need medical, police, or fire. The first question is "what is wrong?" If they key on any immediate life threatening emergencies, a fire unit is dispatched and any medical call of any nature is immediately transferred to a separate REMSA dispatch center. When the caller is transferred they are asked for location and phone number, multiple times before they ask what is wrong. This occurs even though REMSA has the enhanced 911 displays. This takes up to 2 minutes to get to this point. The Reno call taker tries to stay on the line but with the prevalence of cell phones, is often times too inundated with 911 calls, particularly if the medical is a public area. If the Reno dispatch call taker cannot discern if it is a priority 1 or 2. REMSA will page the fire dispatcher on a radio frequency. This is anywhere from a minute to 3 minutes or longer to dispatch a fire unit that it took to dispatch an ambulance. When the REMSA Call taker gets the location, they page their ambulance on an alpha pager or radio and have them respond in the direction of the call while they are still determining what the call is. NHP calls REMSA directly and never notifies fire of accidents. When comparing numbers, it is not a level playing field and fire has built in delays. If fire and REMSA were dispatched at the same time, REMSA would arrive on scene first half as much as they currently do. The simple solution is to co-locate the two dispatch centers and combine the call taking functions.

In January 2006, the dispatch protocols were changed to reflect dispatch of a fire unit directly off the initial 911 call information on all life threatening emergencies (Priority 1 and Priority 2) instead of waiting to be notified by REMSA resulting in a 10% average decrease in response times to medical emergencies department wide.¹ This translates into a reduction of the average response times in the City Core area from 5 minutes and 57 seconds to 5 minutes and 21 seconds with the downtown station averaging 4 minutes and 30 seconds, an average reduction of 11.74%. The outlying areas (including the Truckee Meadows Areas) where response times are longer and the stations farther apart, the average response time decreased from 7 minutes and 31 seconds to 6 minutes and 58 seconds, an average reduction of 8.47%

REMSA utilizes a staffing system known as “system status management” where statistical analysis of the frequency of time and location of past call patterns are the basis of the location and number of ambulances at any given time. The response criteria (8 minutes) allow them the leeway to adjust for annual shifts in statistics without penalty. One feature of this system is that as ambulances stationed in the core areas become busy, the ambulances stationed in the outlying area are moved to intermediate locations closer to the core, pulling them out of those areas. There are fewer ambulances on certain days of the week, as well as, certain times of the day.

The fire department is staffed the same 24 hours a day with the number of personnel needed to perform its fire and rescue mission. There is no additional line staffing for EMS functions. Since these personnel are on duty 24/7 in locations optimized for response times, providing emergency medical response is a good fit. This is a complementary service and not one of competition. The future is ripe for a closer cooperative bond between the ambulance provider and the fire department to serve the public with the highest level of service and the best chance for a positive outcome when experiencing a medical emergency.

Staff is currently meeting with REMSA management to explore methodologies to optimize the response between the two agencies. The two agencies will be examining the recent Audit recommendations to see how to best implement many of the suggested changes, as well as, how to reduce many of the obstacles that have existed between the two in the past.

Truckee Meadows Fire Protection District should continue to work with REMSA to reduce response times and enhance the level of service provided to the community

Fire Prevention within the Truckee Meadows Fire Protection District

Fire Prevention activities and code enforcement for the Truckee Meadows Fire Protection District (TMFD) is provided by the City of Reno through the 2000 INTER-LOCAL AGREEMENT (Agreement). At the time of this report a full time staff in the City of Reno Fire Department, Fire Prevention Division includes: a Fire Marshal and 11 other full-time fire prevention professionals.

Through the Agreement, the City of Reno provides fire prevention, public education, plan review and inspection, and fire investigation functions.

The fire plans checking section reviews plans to determine compliance with the International Fire and Building Codes as well as all local codes, ordinances, standards, and regulations. Plans checkers look for such things as adequate and compliant fire safety systems, fire resistant building materials, and proper and adequate exiting. Fire plans checkers are certified by the International Code Council.

² Numbers from the Incident Reporting system comparing the first quarter of 2005 to 2006.

The Reno/TMFD has an active Company Fire Inspection program that works with the Fire Prevention Division to assure fire and life safety to the residents, businesses, and visitors to the community. The Company Fire Inspection program is a system where on-call fire suppression fire crews are assigned specific fire and life safety inspections within the community.

The total number of fire inspections completed in 2008 for the Reno/TMFD was reported to be approximately 2,500 inspections. These inspections include: Assembly, Residential, Industrial, Commercial, Retail, and other required inspections.

The Reno Fire Department adopts two fire codes, one in the City of Reno and the other in the unincorporated areas of Washoe County which are covered by the Truckee Meadows Fire Protection District.

The City of Reno has adopted the 2003 Edition of the International Fire Code (IFC) with specific amendments. The City adopted the 2003 IFC with amendments in 2005 by resolution of the Reno City Council. The ordinance resides in Chapter 1606, Section 16.06.010 of the Reno Municipal Code. The Truckee Meadows Fire Protection District has adopted the 2003 edition of the International Fire Code through action of the Washoe County Board of Commissioners. The 2003 IFC is found in Chapter 60 of the Washoe County Code.

The IFC is printed by the International Code Council (ICC). The International Code Council, a membership association dedicated to building safety and fire prevention, develops the codes used to construct residential and commercial buildings, including homes and schools.

The purpose of the ICC according to the ICC website is to: "There are substantial advantages in combining the efforts of the existing code organizations to produce a single set of codes. Code enforcement officials, architects, engineers, designers and contractors can now work with a consistent set of requirements throughout the United States. Manufacturers can put their efforts into research and development rather than designing to three different sets of standards, and can focus on being more competitive in worldwide markets. Uniform education and certification programs can be used internationally. A single set of codes may encourage states and localities that currently write their own codes or amend the model codes to begin adopting the International Codes without technical amendments. This uniform adoption would lead to consistent code enforcement and higher quality construction. The code organizations can now direct their collective energies toward wider code adoption, better code enforcement and enhanced membership services. All issues and concerns of a regulatory nature now have a single forum for discussion, consideration and resolution. Whether the concern is disaster mitigation, energy conservation, accessibility, innovative technology or fire protection, the ICC provides a single forum for national and international attention and focus to address these concerns."

The ICC code process is member driven through their code development process. "Any interested individual or group may submit a code change proposal and participate in the proceedings in which it and all other proposals are considered. This open debate and broad participation before a committee comprised of representatives from across the construction industry, including code regulators and construction industry representatives, ensures a consensus of the construction community in the decision-making process. A major advantage of ICC's consensus-based private-sector code development process is that it allows both the ICC code development committees and eligible voting members at the code change hearings to participate in establishing the results of each proposal. Voting members may either ratify the committee's recommendation or make their own recommendation. The results of all votes are published in the report of the ICC code development hearings.

Eligible voting members review the recommendations of the ICC code development committee and determine the final action. Following consideration of all public comments, each proposal is individually balloted by the eligible voters. The final action on the proposals is based on the aggregate count of all votes cast. This important process ensures that the International Codes will reflect the latest technical advances and address the concerns of those throughout the industry in a fair and equitable manner."

The 2006 edition of the IFC is the most current fire code adopted by the ICC. This edition has been adopted in the North Lake Tahoe Fire Protection District. Review of this edition of the IFC and possible adoption by the TMFD is recommended.

The current fire code has specific local amendments included in the adoption of these codes. The amendments are made and adopted based on specific local conditions. Chapter 60 of the Washoe County Code also includes the fee structure for permits and inspections.

The adopted 2003 edition with amendments can be viewed on the District's website at:

http://www.co.washoe.nv.us/clerks/files/pdfs/county_code/Chapter060.pdf

In addition to the 2003 IFC and Chapter 60 of the Washoe County Code, the fire district is regulated by the Nevada Administrative Code (NAC), Chapter 477- State Fire Marshal. The NAC 477 is adopted by the Nevada Legislature and all Nevada fire agencies are regulated by this law. NAC 477 covers specific fire prevention requirements of the State Fire Marshal and the SFM's office. NAC 477 regulates the following fire prevention activities: LICENSES AND CERTIFICATES OF REGISTRATION, FIRE SYSTEMS, PORTABLE FIRE EXTINGUISHERS AND FIXED FIRE EXTINGUISHING SYSTEMS, PORTABLE BUILDINGS, AUTOMATIC SPRINKLER SYSTEMS, INSTITUTIONAL BUILDINGS, CHILD CARE FACILITIES, FIREWORKS, CONTAINERS FOR FLAMMABLE OR COMBUSTIBLE LIQUIDS, USE OF EXPLOSIVES IN BLASTING, REVIEW OF PLANS, TYPE 1 EXHAUST SYSTEMS, FIRE STANDPIPE SYSTEMS, and MISCELLANEOUS REQUIREMENTS.

The sale and use of fireworks within the District and throughout the entire county are prohibited by ordinance.

The Truckee Meadows Fire Protection District should continue to provide the fire inspection services in coordination with Reno Fire Department. This is a cost effective and efficient way to maintain the high level of expertise that is needed in a fire prevention bureau.

Public Education

The City of Reno and TMFPD have extensive public education programs which include participation in the regional Smokey Bear Programs through the Sierra Front Wildfire Cooperators. The Fire Marshal serves on the Board of Directors of the Nevada Fire Safe Council. The agencies have partnered with various local chapters to fund and execute various fuel management programs.

Public education is an important component in any fire and life safety system. If TM would alter its dispatch criteria to geo code calls to specific census tracts, that information then could be utilized to focus the public education events on specific issues such as juvenile fire setters, focused fuels management programs and slip and fall prevention for seniors.

Communications

Reno and Washoe primary 911 PSAP and emergency communications facility identified as ECOMM is located on the grounds of Washoe County's Regional Public Safety Training Center campus located north of Reno, east of US-395N at 5195 Spectrum Blvd, Reno NV.

This new campus and adjacent facilities were constructed in early 2000. The ECOMM 911/Dispatch Center became operational in 2003. ECOMM is located within a 2 story building that houses the Washoe County Emergency Operations Center on the 1st floor with the ECOMM Regional 911 Dispatch Center and related administrative offices on the 2nd floor.

The Dispatch Center appears to be fully NFPA1221 compliant with generator and UPS backup. In addition, the facility appears to be built to Essential Services Seismic Requirements although no specific engineering data was provided for this analysis. With an external radio tower, the grounding system appears to be adequate, but should be fully examined to determine if the R56 Grounding Standard has been met to protect the facility from transient grounding issues or lightning strikes. The 911 Dispatch Center's security is closely monitored by a closed circuit security system with an electronic gate and door access control. The facility co-exists on the 120 acre campus of the Regional Public Safety Training Center. The RPSTC operates under an inter-local agreement between most of the public safety agencies in Washoe County and the Truckee Meadows Community College District.

The Washoe 911 Center is the primary Public Safety Answering Point (PSAP) and 911 Dispatch Center for 8 agencies in the greater Washoe County area. Those agencies include :

- Reno Police Department
- Reno Fire Department(Includes Truckee Meadows FPD)
- Washoe County Sheriff's Department
- Washoe County Search and Rescue
- University of Nevada Police Department
- Truckee Meadows Community College Police department
- City or Reno Marshal's Office
- Sierra Fire Protection District

However, Incline Village and the surrounding areas are dispatched from an independent dispatch center managed by the Washoe County Sheriff's Office utilizing the Washoe County Sheriff's Incline Substation as its facility. The Incline PSAP/911 Center also dispatched all fire and EMS 1st responder and ambulance transport services (fire based, not REMSA) for the North Lake Tahoe Fire District (Incline and adjacent areas).

Although the Incline area 911 Dispatch Center is an independent operation under the direct control of the Washoe County Sheriff's Department, they are technically linked with the ECOMM network for utilization of the Tiburon CAD functionally.

The City of Sparks also operates a separate 911 PSAP dispatch center for the Sparks Police and Fire Department. However, unlike the Sheriff's Incline Dispatch Center, Sparks relies on REMSA (Reno Emergency Medical Services Authority) to initiate pre-arrival EMS instructions and EMS transport services.

The primary ECOMM is a regionally based operation that is housed in a Washoe County leased facility. However the 911 center is under the jurisdiction of the City of Reno (Technology Department) for its day-

to-day functions and operations. The 911 Center is staffed by the City of Reno employees (dispatchers), and is under the direction of a Center Manager (position currently vacant although temporarily filled internally) who reports to the City of Reno's Communications & Technology Director, Mr. Rick Vandenberg. Although managed by the City of Reno, various user groups and operations committee in the Washoe area provide input to the dispatch operation either directly or indirectly through staff representation. Individual agency operational change requests are generally coordinated directly with the Washoe Dispatch Center Manager or assigned staff.

ECOMM provided incident call activity for the year 2008 includes:

- Fire & EMS = 30,895 = 14% of total calls
- Law enforcement related= 184,014 = 86% of total calls
- 911 Calls Received= 59,405
- 911 wireless calls received = 101,120

The Reno Information Technology Department maintains most all the technology features of the 911 Dispatch Center through its own internal staff or external contract support. The Computer Aided Dispatch system (CAD) is manufactured by Tiburon Pubic Safety Software Solutions in Pleasanton, California. The CAD system is a robust law enforcement/fire based system that continues to evolve as the needs of the Washoe County area grows. Even though the Incline area is dispatched separately utilizing an independent facility located in Incline Village, the Tiburon CAD is linked to the Incline location for utilization of the centralized geo-file, run-database and CAD functionally.

The Tiburon CAD is a fully automated system that includes various interfaces to external devices such as;

- Push to talk radio ID (via 800MHz)
- Mobile Data Terminals (although not fully deployed regionally)
- Paging and fire station alerting
- E911 call transfer
- CAD Records Management (AKA Tiburon Mobile Reports)
- TDD/TTY
- AVL (although not fully utilized)
- Zetron (fire alerting via conventional fire pagers)
- Geofile

Truckee Meadows participation in the regional dispatch center is a cost effective way to focus on appropriate response, mutual and auto aid. Dispatch needs to address fractile response criteria.

Legal Authority

Nevada law consists of the Constitution of Nevada (the state constitution) and Nevada Revised Statutes. The Nevada Revised Statutes (NRS) are the current codified laws of the State of **Nevada**. The **Nevada Supreme Court** interprets the law and constitution of Nevada. The Statutes of Nevada are a compilation of all legislation passed by the Nevada Legislature during a particular Legislative Session. The Nevada Administrative Code (NAC) is the codified, administrative regulations of the Executive Branch. The Nevada Register is a compilation of proposed, adopted, emergency and temporary administrative regulations, notices of intent and informational statements. Nevada Supreme Court Opinions are the written decisions of the Nevada Supreme Court.

There are several chapters of the NRS that apply to Sierra Fire Protection District and the Truckee Meadows Fire Protection District.

In Title 22 - Cooperative Agreements by Public Agencies; Planning and Zoning; Development and Redevelopment there is Chapter 277 which addresses: Cooperative Agreements: State, Counties, Cities, Districts and Other Public Agencies. This is the Chapter that allows the Washoe County to enter into cooperative agreements.

In Title 42 - Protection from Fire/Explosives, there are several Chapters that apply to Sierra Fire Protection District and Truckee Meadows Fire Protection District.

Chapter 472- State Forester/Fire Warden

Chapter 473- Fire Protection Districts Receiving Federal Aid

Chapter 474-County Fire Protection Districts

Chapter 475- Crimes and Responsibilities Concerning Fires

Chapter 476- Explosives and Inflammable Materials

Chapter 477- State Fire Marshal

Truckee Meadows Fire Protection District Fire Station Locations

Station Designation	Station Name	Address	City/Area	State	Zip
Truckee Meadows Fire Protection District (Paid)					
Reno/ TMFPD 13	Reno Fire Dept/ TMFPD Station 13	10575 Silverlake Rd	Reno	NV	89506
Reno/ TMFPD 14	Reno Fire Dept/ TMFPD Station 14	12300 Old Virginia Rd	Reno	NV	89433
Reno/ TMFPD 15	Reno Fire Dept/ TMFPD Station 15	130 Quartz Lane	Reno	NV	89511
Reno/ TMFPD 16	Reno Fire Dept/ TMFPD Station 16	1240 Eastlake Blvd	Carson City	NV	89704
Reno/ TMFPD 17	Reno Fire Dept/ TMFPD Station 17	500 Rockwell Ave	Sparks	NV	89441
Reno/ TMFPD 18	Reno Fire Dept/ TMFPD Station 18	3680 Diamond Peak Drive	Reno	NV	89506
Truckee Meadows Fire Protection District (Volunteer)					
TMFPD 220	Cold Springs VFD	3405 White Lake Parkway	Reno	NV	89506
TMFPD 221	Silver Lake Fire Department Sta 221	11525 Red Rock Road	Reno	NV	89508

TMFPD 223	Lemon Valley Station 223	130 Nectar St	Reno	NV	89506
TMFPD 225	Wadsworth 225	400 Stamp Mill Rd	Reno	NV	89442
TMFPD 226	Hidden Valley Auxiliaries	3255 W Hidden Valley Dr	Reno	NV	89502
TMFPD 227	Pleasant Valley Station 227	3010 Lakeshore Dr	Carson City	NV	89702
TMFPD 229	Palomino Valley Station 229	6015 Ironwood Rd	Reno	NV	89510
TMFPD 237	Pleasant Valley Station 237	12300 Old 395 South	Reno	NV	89511

Truckee Meadows Fire Protection District Apparatus

Station 13	Engine 13, Water Tender 13, Brush 13
Station 14	Engine 14, Brush 14, Medium Rescue
Station 15	Engine 15, Truck 15, Brush 15
Station 16	Engine 16, Water Tender 16, Brush 16
Station 17	Engine 17, Water Tender 17, Brush 17
Station 18	Engine 18, Water Tender 18, Brush 18

Truckee Meadows Fire Protection District (Volunteer)		
TMFPD 220	Cold Springs VFD	E 220 Type 3 Brush Engine Light Truck
TMFPD 221	Silver Lake VFD	E 221 Type 3 Brush Engine Type 6 Brush Engine Water Tender 221
TMFPD 223	Lemon Valley VFD	E 223 Type 3 Brush Engine
TMFPD 225	Wadsworth VFD	E 225 WT225 Type 3 Brush Engine
TMFPD 226	Hidden Valley Aux	E 226 Type 3 Brush Engine
TMFPD 227	Pleasant Valley VFD Station 227	Engine 227 Type 3 Brush Engine Patrol

TMFPD 229	Palomino Valley Auxiliary	E 229 Type 3 Brush Engine Water Tender Patrol
TMFPD 237	Pleasant Valley VFD Station 237	E 237 Patrol

References

Description of Fire Service Deployment Assets

March 2008

Emergency Services Consulting Incorporated

Automatic and Mutual Aid

Automatic Aid

There are a vast amount of fire resources available within Washoe County. Automatic Aid agreements have been established between two or more fire departments in advance of the emergency. Reno/Truckee Meadows Fire Departments have Automatic Aid agreements with the Sparks Fire Department, The Sierra fire protection District and the Reno/Sparks Indian Colony. Truckee Meadows FPD has a very robust automatic aid agreement with the City of Sparks, this is critical to Spanish Springs, Wedekind Way/Ponderrosa, and the East Sparks area of Truckee Meadows.

Mutual Aid

Mutual aid is the assistance from one fire department to another when specific equipment has been requested after the initial dispatch to an emergency incident. Reno/Truckee Meadows Fire Departments have mutual aid agreements with the following agencies:

- Sparks Fire Department
- Sierra Fire Protection District
- North lake Tahoe Fire Protection District
- Nevada Air National Guard
- United States Forest Service, Humboldt, Toiyabe, Carson Ranger District
- Bureau of Land Management, Carson City District
- Carson City Fire Department
- Tahoe Regional Fire Chief's
- Storey County
- Sierra County (California)
- Cal Fire thru Nevada Division of Forestry
- North Lyon County FPD
- Nevada Division of Forestry

- Pyramid Lake Piute Tribe
- Reno-Sparks Indian Colony

The Mutual Aid system requires that the following questions be answered:

Type of equipment requested- structural engine, brush truck, aerial truck, etc.

When is the equipment needed-immediately, planned need, stand-by, etc.

Where is the equipment needed-to the scene, at a staging area, to a specific station for coverage, etc.

Phone number for agency requesting assistance.

Radio frequency assignment designated by the requesting agency.

Fire Apparatus available from various agencies within Washoe County

Types of Apparatus	Estimated Numbers of Apparatus
Type 1 Engines (Structure)	74
Aerial Ladder Trucks	6
Brush Engines (Wildland)	29
Water Tenders	10

Tribal Agreements

The Pyramid Lake Indian Reservation is a sovereign nation within the TMFPD. TMFPD has no jurisdictional on Tribal land and responds to fires and emergencies by a separate Interlocal agreement and responds for wildfires by agreement with the Bureau of Indian Affairs through the Bureau of Land Management.

Hungry Valley Indian Colony is a part of the Reno-Sparks Indian Colony Downtown, the TMFPD has no jurisdictional responsibility on Tribal land and responds to fire and emergencies through a separate Interlocal agreement and responds to wildfires by agreements with the BIA through the BLM. This colony has non-contiguous commercial parcels in Districts 14 and 17.

Truckee Meadows Fire Protection District has greatly benefitted from the Interlocal Agreement with the Reno Fire Department. Both agencies have a metropolitan approach to fire protection, emergency medical response and the variety of specialized teams to deal with urban search and rescue, water rescue and hazardous materials response. This is a very cost effective for the citizens of the Truckee Meadows Fire Protection District.

Infrastructure within the TMFPD

Highways and Other Access

Primary access to Truckee Meadows Fire District is Interstate 80, the main west-east corridor in Washoe County. US Highway 395 dissects the County in a North- South direction and Franktown Road and Old US Highway 395. Numerous common carriers provide interstate and intrastate service.

Fire Flow

Fire Flow in Washoe County is handled by the Department of Water Resources. There are three major purveyors of water Washoe County, Truckee Meadows Water Authority and the South Truckee Meadows General Improvement District as well as a handful of private companies. The guidelines for fire flow can be found in the Nevada Administrative Code 445A.6672 Existing systems: Minimum capacities; minimum pressure and velocity of water; total capacity of groundwater systems; timely completion of water projects. (NRS 445A.860) A supplier of water for an existing public water system shall:

1. Ensure that the public water system maintains a sufficient capacity for the development and treatment of water, and a storage capacity of sufficient quantity, to satisfy the requirements of all users of the public water system under the conditions of maximum day demand and peak hour demand.
2. Ensure that the residual pressure in the system is:
 - a. At least 20 psi during conditions of fire flow and fire demand experienced during maximum day demand.

We are unable to determine if there are planned water system improvements in the Truckee Meadows Fire Protection Districts boundaries because they were combined into the City of Reno's boundaries

Truckee Meadows Fire Protection District has water tenders built into response areas that are deficient with water supply.

Growth within the TMFPD

There are some infill projects within the Truckee Meadows Fire Protection District that the City of Reno is anticipated not to annex. There is a somewhat controversial project is the lower end of Saint James Village at the North Eastlake and S. Virginia intersections. There is a significant part of that development in TMFPD with a portion in Sierra. There are some subdivisions on the back side of Hidden valley that will remain in the TMFPD and some in Sun Valley. There are plans for some large scale development in Spanish Springs-Warm Springs-Palomino Valley (South of the Northern District Boundary). The rest is individual sites (some horizontal highrises) and some scattered commercial development.

Special Challenges for the Fire and Life Safety System facing the TMFPD

Senior Citizen

The Elderly in Washoe County present many challenge to fire service agencies. Generally, Fire Service agencies respond to a large number of medical emergencies for the elderly. Nevada has long ranked last or in the bottom five of all states related to the Healthy People 2010 goals and major health indicators. The leading causes of death in Nevada among older persons were diseases of the heart, cancers, and chronic lower respiratory diseases. In 2003, 355 deaths of persons 55+ were caused by influenza and pneumonia; 307 deaths were due to Alzheimer's Disease, and 143 chronic liver disease and cirrhosis. Death due to car accidents are highest among older adults than any other age category.

Reference

Washoe County Senior Citizens Strategic Plan

Institution and Group Quarters Population for persons 65+ in Washoe County, 2005

The Truckee Meadows Fire Protection District has addressed the issue of the elderly in the TMFPD with having EMT Intermediate trained personnel on the apparatus.

Flood Hazard

Causes of Flooding

Flooding occurs when climate (or weather patterns), geology and hydrology combine to create conditions where river and stream waters flow outside of their normal course and “overspill” beyond their banks. In Washoe County, the combination of these and other factors, create chronic seasonal flooding conditions. Flooding is most common December through March in Washoe County when storms encompassed with warmer temperatures and heavy rainfall come over the snow-packed Sierra Nevada mountains. Larger floods result from the heavier rains that continue over the course of several days, incorporated with by snowmelt at a time when the soil is near saturation from previous precipitation. Riverine flooding and urban flooding are the two types of flooding that primarily affect Washoe County. Riverine flooding is the overbank flooding of rivers and streams, the natural process of which adds sediments and nutrients to fertile floodplain areas. Urban flooding results from the conversion of land from fields or vacant land to buildings, parking lots and roads, though which the land loses its ability to absorb rainfall and the water runoff from the storms causes increased water in the low-lying areas.

Reference

Washoe County Website- Flood Awareness

Truckee Meadows Fire Protection District is well prepared with the Reno/TM Fire Departments WET (Water Entry Team).

Earthquakes

The Reno-Carson City urban corridor is the second most populated region in Nevada, and lies in one of the most seismically active parts of the State. There are at least 30 faults that could cause damage in the Reno-Carson City urban corridor. The probability of at least one magnitude 6 or greater event in the next fifty years is between 34 and 98%. The probability of at least one magnitude 7 or greater event in the next fifty years is between 4 and 50%. Hazards include intense ground shaking, ruptures of the ground, liquefaction, landslides, and ancillary problems, such as fires and hazardous waste spills.

Source- Nevada Bureau of Mines and Geology

The Citizens of the Truckee Meadows Fire Protection District are protected by the Reno/TM Fire Departments Urban Search and Rescue Team.

Water Rescue Scenarios

Water rescues can be particularly dangerous for rescuers. Conditions that can affect water rescue operations include volume and velocity of water, floating debris, unusual drop-offs, water depth and hydraulic effects, as well as dangers that may be hidden below the surface that can result in rescuers becoming trapped in rocks or other debris, or being cut by glass, metal and other items on the river bed.

Swift water situations can carry a person away quickly, and often the temperature of the water will quickly lead to hypothermia that can incapacitate anyone who ventures into or falls into the Truckee River. Hypothermia occurs when the body's core temperature is dramatically lowered. Among other results, there is a loss of strength and muscular coordination as well as mental confusion and often erratic behavior that can all combine to overcome the victim's swimming skills, and ultimately lead to drowning.

The Truckee Meadows Fire Protection District is well prepared with the Reno/TM fire Department WET (Water Entry Team)

Hazardous Materials

The transportation and storage of hazardous materials is clearly a regional issue. A large quantity of hazardous products are transported on highways and railways where the potential for release of this material into the environment represents a potentially significant public health risk.

Truckee Meadows Fire Protection District participates in the Regional Hazardous Material Response team with Sparks, Reno and TM fire Departments.

Wildland Fire and fires in the Wildland/Urban Interface

Wildland/urban interface refers to the geographical areas where formerly "urban structures-mainly residences-are built in close proximity to the flammable fuels naturally found in wildland areas, including forests, prairies, hillsides and valleys. The results can be aesthetically desirable...or disastrous"

As urban areas expand into wildland areas and as an increasing number of homes are built near wildland areas, the conflicts associated with wildland fire become more commonplace. Just as wildland fires threaten people and their property, human caused fires threaten wildlands. Thus homeowners and developers benefit by knowing the risks and protection strategies related to home development in wildlands.

A dream home built in an idealistic wildland setting can be razed by fire in a matter of minutes. Likewise, the exemplary scenery that attracted homeowners to the setting can be altered, often because of the inadvertent action of the homeowner.

City of Reno/TMFPD Wildland Agreement Matrix

The City of Reno and TMFPD participate with a number of agencies in both providing resources for a

Wildland incidents. This matrix focuses on the formalized agreements that provide for resources into the City of Reno/TMFPD

Agency	Resources Received by Reno/TMFPD
Sparks	1-2 Type 3 or Type One engine
Sierra Fire	1-2 Type 3 or Type One engine, 1 Water Tender
Carson City	1-2 Type 3 or Type One engine, 1 Water Tender
Storey Fire	2-3 Type 3 or Type One engine
Fernley Fire	1 Type 6 or 1 Type One engine, 1 Water Tender
NLTFPD	2 Type 3 or Type One engines, Two 20 person Hand crews
Lake Tahoe Fire Chiefs	10 Type One or Type 3 engines, Water Tenders
Nevada Mutual Aid System	10 Type One or Type 3 engines, Water Tenders
BLM Carson	4 type 3 or type One engines, Water Tenders
USFS HTF	4 type 3 or type One engines, Water Tenders
BLM Surprise Valley	1 Type 3, 1 Command
BLM Winnemucca	1 Type 3, 1 Command
NDF	2 type 3 engines, 1 Water Tender

BLM, HTF and NDF will pay for aircraft, crews and dozers on initial attack only if their lands are involved or directly threatened. Recently NDF changed its position to provide NDF initial attack resources for one operational period at no charge. Extended attack fire will be cost shared to include all resources.

The Truckee Meadows Fire Protection District participates with the Sierra Fire District on a fuels management crew. This is critical for Washoe County Fire Agencies and should be continued to be funded and supported.

The Truckee Meadows Fire Protection District should negotiate an extended attack cost agreement with NDF

Eight Components of Standards of Cover Systems

The Standards of Cover systems approach consists of the following eight components:

- Existing deployment
- Risk identification
- Risk expectations
- Service level objectives
- Distribution
- Concentration
- Performance and reliability
- Overall evaluation

Existing Deployment Policies

All agencies have an existing policy, even if it is undocumented or adopted by the locally responsible elected officials. Originally, stations and equipment were located to achieve certain expectations. How and why they were sited needs to be historically understood, described and contrasted to proposed changes.

Table for Assessing Land Use Against Response Needs

Land Use Category	Definition	Use Rate & Risk Factors	Travel Time	Concentration	Effective Response Force
Single Family Residential	Single family dwellings Small lot less than one acre	High use for medical aids Low frequency of fire 24-hour a day problem	4 minutes 59 seconds or under 5 minutes 90% of the time	7 minutes 59 seconds or under 8 minutes	Minimum of 13 personnel within 10 minutes
Multi-family Dwellings	Under 10 Apts/Units	Same as Residential			
	11 to 25 Apts/Units	Same as Residential			
	Over 25 Apts/Units	Somewhat higher than residential			Minimum of 15 personnel within 10 minutes
Planned/Centralized Commercial (non-assembly)	Under 5,000 sq ft	Low for EMS Moderate for Fire	3 minutes 49 seconds 90% of the time	7 minutes 59 seconds or under 8 minutes	Minimum of 15 personnel within 10 minutes
	5,000 to 20,000	Very low for EMS			Minimum of 15 personnel
	Over 20,000 Square Feet	Very low for EMS Major loss potential for fire			Minimum of 21 personnel within 12 Minutes

Land Use Category	Definition	Use Rate & Risk Factors	Travel Time	Concentration	Effective Response Force
Public Assembly	Under 50 Occupants	Low frequency Moderate impact	3 minutes 49 seconds 90% of the time	7 minutes 59 seconds or under 8 minutes	Minimum of 15 personnel within 10 minutes
	Over 50	Very low frequency Very high impact	3 minutes 49 seconds 90% of the time	7 minutes 59 seconds or under 8 minutes	Minimum of 21 personnel within 12 Minutes
Industrial	1,000 gpm or less	Industrial EMS High loss ratio	Level of Acceptable Risk		Minimum of 17 personnel
	1,001 to 3500 gpm	Industrial EMS Moderate loss ratio			Minimum of 21 personnel
	3,501 to 5,000 gpm	Industrial EMS Very high loss ratio			Minimum of 24 personnel
Single Family (large lots)	Lot sizes 2 to 5 acres	EMS priority Fire moderate	6 minutes 59 seconds 90% of the time	10 Minutes	Minimum of 15 personnel within 10 minutes
Rural Development	Lot sizes over 5 acres	EMS priority Fire is infrequent occurrence	20 minutes	30 minutes	None Designated
Wildland Area	No subdivided parcels Size expressed in square acres or square miles	Rescue issues Containment of ground fuels	30 minutes	1 Hour	None Designated

The table is a description of Published Standards for Emergency Response as defined by a variety of resources, including the National Fire Protection Association, the Insurance Services Office, the Center for Public Safety Excellence, etc.

Description of Published Standards

National Standard for Comparison	Organization
Minimum effective company staffing is 4 firefighters	Dallas FD Study, Seattle FD Study, NFPA Standards, Federal OSHA
Engine co. within 1.5 miles of built upon areas	Insurance Services Office (ISO)
Ladder truck within 2.5 miles of built upon areas	Insurance Services Office (ISO)
Staffed ladder truck should be available if 5 or more buildings exceed 35' in height or fire flow exceeds 3500 gpm.	Insurance Services Office (ISO)
Average fire-ground staffing to be 15 firefighters for moderate risk fires (single family residential) and up to 53 for high risk fires (industrial, high risk unprotected residential, etc.) <i>Called Critical Tasking</i>	Center for Public Safety Excellence, Commission on Fire Accreditation International
National average of on-duty personnel = .48 per 1,000 population	International City/County Management Association (ICMA)
National average total uniformed personnel = 1.59 per 1,000	International City/County Management Association (ICMA)
Arrive at structure fire prior to flashover (typically 5 to 7 minutes from ignition)	FEMA National Fire Academy
Arrive at EMS call within 4 to 6 minutes of cardiac or respiratory arrest	American Red Cross

Truckee Meadows Fire Protection District Comparison

National Standard for Comparison	TMFPD
Minimum effective company staffing is 4 firefighters	Meets Standard
Engine co. within 1.5 miles of built upon areas	Does not meet this standard consistently
Ladder truck within 2.5 miles of built upon areas	Does not meet this standard consistently
Staffed ladder truck should be available if 5 or more buildings exceed 35' in height or fire flow exceeds 3500 gpm.	Meets Standard with Inter Local Agreement

Average fire-ground staffing to be 15 firefighters for moderate risk fires (single family residential) and up to 53 for high risk fires (industrial, high risk unprotected residential, etc.) <i>Called Critical Tasking</i>	Meets Standard with Inter Local Agreement
National average of on-duty personnel = .48 per 1,000 population	Does not meet standard, currently .31 per 1,000 population
National average total uniformed personnel = 1.59 per 1,000	TMFPD funds 28 personnel per the Interlocal Agreement, with a total of 89 uniformed personnel. The Standard is .99 per 1,000 population.
Arrive at structure fire prior to flashover (typically 5 to 7 minutes from ignition)	Generally meets this Standard
Arrive at EMS call within 4 to 6 minutes of cardiac or respiratory arrest	Generally meets this Standard

Truckee Meadows Fire Protection District Apparatus Response

Truckee Meadows and City of Reno apparatus are seamlessly integrated into the system.

Alarm Assignment	Response
First Alarm Assignment (still alarm)	Truckee Meadows Engine
First Alarm Assignment in Volunteer area	Truckee Meadows Engine and Volunteers
First Alarm EMS	Truckee Meadows Engine
First Alarm High Risk (multi company still alarm)	Truckee Meadows Engine, Truck, Battalion Chief, Safety, Volunteers if area has Volunteers
Second Alarm	Battalion Chief, 3 additional engines, Reno Truck, Reno Rescue, Safety and Volunteers
First Alarm Brush (winter)	Engine or Brush, Volunteers if in a district with Volunteers
Second Alarm Brush	Battalion Chief, Engine, 2 Brush Engines, Water Tender, Safety, and Volunteers if in a district with Volunteers
Second alarm urban	3 Engines, 1 truck, 1 Battalion Chief, Safety, and Volunteers if in a district with Volunteers
Brush Task Force	3 brush engines, 1 water tender, 2 Battalion Chiefs, Safety and Volunteers if in a district with Volunteers

Reference: Reno Fire Department

Truckee Meadows Response Criteria

5 Minutes (e.g. EMS and first arriving company at structure fires)

One engine company with four firefighters at 85% of reported incidents within five minutes. This “objective” is deemed critical for emergency medical and significant for structure fire response.

12 Minutes (e.g., structure fire response)

Three engine companies or two engine companies and one ladder truck with 10 firefighters arriving at 85% of reported incidents within 12 minutes. This “objective” is deemed significant for structure fire response.

In those areas of the Truckee Meadows Fire Protection District designated by the District as “rural” the response objectives are:

15 Minutes (e.g., EMS and first arriving company at structure fires)

One engine company with four firefighters at 85% of reported incidents within 15 minutes. This “objective” is deemed significant for wildland fire control.

27 Minutes (e.g., structure fire response)

Three engine companies, or two engines and one ladder truck, with 10 firefighters arriving at 85% of reported incidents within 27 minutes. This “objective” is deemed significant for protecting structures in the Wildland-urban interface

Source: Adopted by the Board of Fire Commissioners May 2000

Building Risk Identification and Assessment

RISK ASSESSMENT METHODOLOGY

Truckee Meadows Fire Protection District must assess risks based upon the potential frequency (probability of an incident occurring) and consequence (potential damage should an event occur). For example, a terrorist act has a low probability; however, if a terrorist act occurs, the damage and the psychological impact are potentially very high. This same outlook regarding risk assessment can also be applied to natural disasters. For example, an earthquake generally does not hit the same communities every year; but, if it does strike, the damage can be great. Conversely, medical emergencies happen every day. The overall potential damage from medical emergencies to the community as a whole is not nearly as significant as that from an earthquake or other natural disaster (though these individual incidents greatly affect those requiring the service). To design future deployment strategies, the department must be able to compare the potential frequency and potential damage of events that may affect the community and service area. Risk management is the analysis of the chance of an event occurring and the resulting damage that could occur as a result of the event.

Probability Matrix

<i>High Probability Low Consequence</i>	<i>High Probability High Consequence</i>
<i>Low Probability Low Consequence</i>	<i>Low Probability High Consequence</i>

For example: structure fires are relatively infrequent in comparison to medical incidents in the Truckee Meadows Fire Protection District and its service areas; however, the loss of subsequent dollars, loss of irreplaceable items, and loss of business or jobs make the consequences of such fires high; activation of automatic fire alarms is high probability with low consequence; earthquakes or a large hazmat incident may be infrequent but represent a large potential loss to life and property. Comparatively, a dumpster fire may be a high probability but have little consequence outside of the fire response. With an understanding of the different levels of probability and consequences, proper strategic planning in respect to risk management, and resource deployment can take place. The challenge in community risk management does not lie solely in the work necessary to assess the probabilities of an emergency event in a community, but in the political arena as well. It is the policymakers who will determine the level of service to be delivered to the area being served. The evaluation of fire risks must take into account the frequency and severity of fires and other significant incidents. Determining risk by analyzing past statistical information and projected growth in the service area is essential to the development of a workable five-year fire department strategic plan.

The relationships between probability and consequence and the community's adopted service level goals determine the needed concentration and distribution of resources. Distribution is the number of resources placed throughout the District. Concentration is the number of resources needed in a given area within the District. This varies depending on many factors including the number of events (calls) for service; the risk factors of the area; the availability, reliability, and time of arrival of secondary responding units; etc. A challenge will be to fund the proper balance for the distribution and concentration of resources needed to meet the service level goals today and in the future as the District and service areas continue to grow.

RESOURCE MANAGEMENT

Building Risk Identification and Assessment consists of three elements:

- Fire Flow: The amount of water to control the emergency, which is based on structure, contents and exposures, *and*
- Probability: The likelihood that a particular event will occur within a given period of time. An event that occurs daily is highly probable. An event that occurs only once in a century is very unlikely. Probability then is an estimate that an event will occur and a prediction that it will be very close by in time, or sometime off in the future, *and*
- Consequence: There are two components - Life Safety (the amount of emergency

personnel and equipment to rescue or protect the lives of an occupant from life threatening situations); and Economic Impact (the losses of property, income or irreplaceable assets).

Building Risk Assessment is performed at three levels of measure:

- **Occupancy Risk:** defined as an assessment of the relative risk to life and property resulting in a fire inherent in a specific occupancy or in a generic occupancy class.
- **Demand Zone:** defined as an area used to define or limit the management of a risk situation. A Demand Zone can be a single building, or a group of buildings. It is usually defined with geographical boundaries and can also be called fire management areas or fire management zones. Sometimes Demand Zones are a department's data reporting areas from which historical workload can be defined, or DZ's could be a Planning Department data area that could be used to identify and quantify risks with the area.
- **Community:** defined as the overall profile of the community based on the unique mixture of individual occupancy risks, Demand Zone risk levels and the level of service provided to mitigate those risk levels.

EMS and specialty incident response risk assessment and outcome expectations should also be performed using the criteria from those disciplines. For example, an EMS risk category could be trauma patients, with an expectation to stabilize and transport trauma patients to a designated trauma center within one hour of the accident occurring.

Truckee Meadows Fire Protection District does not track emergency response or do planning by Census Tract areas. Related statistical information, demographics, economic, housing, as well as other socio-economic factors such as per capita income, the percent of population living below poverty line, and unemployment rates are factors that should be taken into account when assessing community risk. Studies indicate the socio-economic factors have a direct relationship on the number and severity of fire incidents. Fires occur disproportionately in areas, which are economically depressed and are directly linked to the ability to afford appropriate housing, fire safety devices, and lack of general maintenance. All are contributing factors to higher rates of fire in areas with lower per capita income. If a fire agencies emergency response is keyed to Census Tracts then a fire agency can model trends such as occurrences of cardiac arrest, which would dictate the use of automatic defibrillation. Census tracts are also useful for community fire education, arson investigation and Wildland Urban Interface programs. Demographics play a major role for a fire officer to assess and react to the changes of his/her community which includes fire stations, fire apparatus, fire prevention initiatives, and trend.

Major Risk Properties within Truckee Meadows Fire District

Station 13, Station 223, Station 221

- Wildland Urban Interface and Intermix
- Major North/South transportation artery (US 395)
- Major rail line North/South Union Pacific Railroad
- Double stack rail terminal
- Long response districts
- Surrounds Stead Airport
- Lack of community water system in the rural area
- Light to heavy commercial corridors and clusters
- Light manufacturing
- Auto wrecking yards
- Propane storage and rail off loading
- Primary residential and large lot agriculture with commercial corridors.
- Various schools
- Large commercial warehousing
- Various residential care homes
- Extreme weather conditions

Station 14, Station 227, Station 237

- Wildland Urban Interface and Intermix
- Major North/South transportation artery (US 395)
- Lack of community water system in the rural agricultural area off Lakeside-Holcomb Way area
- Light to heavy commercial corridors
- Large residential occupancies (horizontal high-rises) 10,000 sq feet
- Convalescent hospital
- Primary residential and large lot agriculture with commercial corridors
- Two high schools, six elementary schools, one special education school
- Large commercial warehousing
- Various residential care homes
- Major irrigation ditch system

Station 15, Sun Valley Station

- Community primarily residential $\frac{3}{4}$ mobile homes in mobile home parks and residential lots of 1/3 to 1+ acre
- Wildland/Urban Interface and Intermix
- Light to heavy commercial corridors
- Manufactured housing 40+ years old to new
- Access difficulties
- Various schools
- Various residential care homes
- Large transient population

Station 16, East Washoe Station, Station 227 and Station 237

- Wildland/Urban Interface and Intermix

- Major North/South transportation artery (US 395)
- Lack of community water system
- Large residential occupancies (horizontal high rises) 10,000 feet
- Washoe Lake recreation area
- Clustered light commercial
- Primarily residential and large lot agriculture
- Subject to extreme winter weather and winds
- 100% Truckee Meadows

Station 17, Truckee Meadows Volunteer Station Palomino Valley Auxiliary.

- Wildland/Urban Interface and Intermix
- Major North/South transportation artery (Pyramid Highway)
- Lack of community water systems in the rural agricultural area
- Large residential occupancies (horizontal high rises) 10,000 feet
- Clustered corridors
- One industrial complex
- Primarily residential and large lot agriculture with commercial clusters
- Various schools
- Large commercial warehousing and manufacturing
- Various residential care homes
- Long response times
- Two uncontrolled air fields

Station 18, Station 220

- Wildland/Urban Interface and Intermix
- Major North/South transportation artery (US 395)
- North/South rail line Union Pacific Railroad
- Commercial cluster
- Truss manufacturing plant
- Various schools, large commercial warehousing
- Various residential care homes

Reno Station 2, 21, Truckee Meadows Station 225

- Wildland/Urban Interface and Intermix
- Major East/West transportation artery (I-80)
- East/West Railroad, Union Pacific Railroad
- Lack of community water system, light to heavy commercial corridors
- The Truckee River
- Primarily residential and large lot agriculture with commercial corridors
- Oil recycling plant
- Auto wrecking yards
- Isolated residences and mobile home clusters

Reno Station 6, Truckee Meadows Volunteer Station Hidden Valley Auxiliaries Station 226

- Wildland/Urban Interface and Intermix

- Steamboat Creek
- Large residential occupancies (horizontal high rises) 10,000 ft
- Reno-Sparks sewer treatment plant
- Various schools
- Various care residential care homes
- Lack of community water systems in the rural agriculture areas off the Lakeside area

Truckee Meadows defines major risk as buildings over 5,000 square feet that are not protected by fire sprinkler systems or occupancies with significant life hazards such as:

Schools
 Senior Citizen Homes
 Strip Malls
 Residential Care Facilities
 Pallet Company
 Hotels/Motels
 Mini Storage
 Manufacturing Facilities within the District

Reference

Reno Fire Department

General Risks within the Truckee Meadows Fire Protection District, this list does not include every possible scenario, just the most common risks.

Type of Risk	Hazards within Risk
Residential Structure Fires	Life Safety, Exposure risks, Firefighter Safety, Property loss, Loss of tax base
Multi Family Structure Fires	Life Safety, Exposure risks, Firefighter Safety, Property loss, Loss of tax base
Commercial Structure Fires	Life Safety, Exposure risks, Firefighter Safety, Property loss, Loss of tax base
Natural Disasters	Life Safety, Possible Multiple simultaneous events, Long duration Event, Long recovery, Loss of Tax base, Possible Hazardous Materials
Man- Made Disasters	Life Safety, Possible Multiple simultaneous events, Long duration Event, Long recovery, Loss of Tax base, Possible Hazardous Materials
Medical Emergencies	Infectious control concerns, Firefighter safety
Hazardous Materials	Life Safety, Long duration Event, Long recovery, Complex issues with Possible public exposure

Urban Search and Rescue	Life Safety, Possible Multiple simultaneous events, Long duration Event, Long recovery, Loss of Tax base, Possible Hazardous Materials, Specialized equipment needs
Wildland Fires	Life Safety, fast moving event, costly use of resources, can be long duration event, Long recovery, Threat to

Service Level Expectations

After understanding the risks present in the community, what control measures do the citizens and elected officials expect? For example, does the agency confine the fire to the compartment of origin, area of origin, floor of origin, or building of origin? Some agencies in sparsely populated areas with long response times like 30 minutes or more might have to accept (not like) an exposure level of service where the building fire does not spread to the adjoining forest and start a conflagration. In EMS we might expect to get a trauma patient to the designated trauma center within the first hour. Each risk category found in a community should have an outcome expectation developed for it. Risks other than structure fires are typically EMS, special rescue like confined space, hazardous materials, airports and airplanes, etc.

EVALUATING FIRE SUPPRESSION CAPABILITIES

Firefighters encounter a wide variety of conditions at each fire. Some fires will be at an early stage and others may have already spread throughout the building. This variation in conditions complicates attempts to compare fire department capability. A common reference point must be used so that the comparisons are made under equal conditions. In the area of fire suppression, service-level objectives are intended to prevent the flashover point, a particular point of a fire's growth that makes a significant shift in its threat to life and property. Fire suppression tasks required at a typical fire scene can vary a great deal. What fire companies must do, simultaneously and quickly, if they are to save lives and limit property damage, is to arrive within a short period of time with adequate resources to do the job. Matching the arrival of resources within a specific time period is the objective of developing a comprehensive Standards of Cover integrated risk management plan.

The Stages of Fire Growth

Virtually all structure fires progress through a series of identifiable stages.

Stage 1: The Ignition Stage—The ignition of a fuel source takes place. Ignition may be caused by any number of factors, from natural occurrences such as lightning to premeditated arson.

Stage 2: The Flame Stage—The fuel initially ignited is consumed. If the fire is not terminated in this stage, the fire will progress to the smoldering stage or go directly to flashover.

Stage 3: The Smoldering Stage—The fuel continues to heat until enough heat is generated for actual flames to become visible. It is during this stage that large volumes of smoke are produced and most fire deaths occur. Temperatures rise throughout this

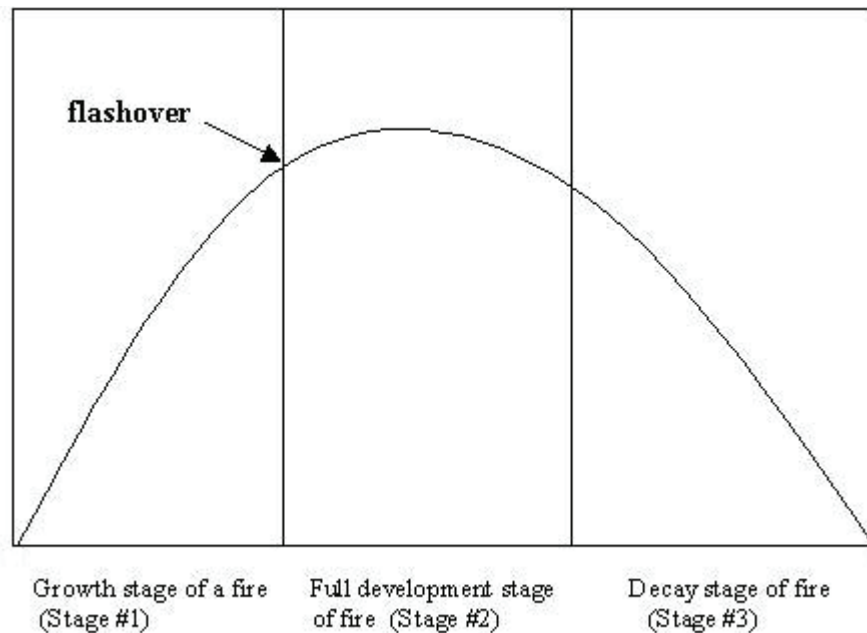
stage to over 1,000 degrees Fahrenheit in confined spaces, creating the hazard of “backdraft” or smoke explosion. This stage can vary in time from a few minutes to several hours. When sufficient oxygen is present, the fire will progress to the free-burning phase.

Stage 4: Free Burning or “Flashover” Stage—The fire becomes free burning and continues to burn until the fire has consumed all contents of the room of fire origin, including furnishings, wall and floor coverings, and other combustible contents. Research into the flashover phenomenon has yielded criteria that precisely measure when flashover occurs; however, any exact scientific measurement in the field is extremely difficult. Observable events that would indicate a flashover are “total room involvement” and “free burning.” These indicators are easily observable by firefighting personnel and the public and can be easily recorded and retrieved for future evaluation. Both scientific tests and field observations have shown when flashover is experienced, it has a direct impact on fire protection and the ability of the emergency services system.

- a. Flashover occurs at a temperature between 1,000 and 1,200 degrees Fahrenheit. These temperatures are well above the ignition points of all common combustibles in residences, businesses, and industries. When this temperature range is reached, all combustibles are immediately ignited. Human survival after this point is highly improbable without specialized protective equipment.
- b. At the point of flashover, lethal fire gases (carbon monoxide, hydrogen sulfide, cyanide) increase explosively. People exposed to these gases, even when not directly exposed to the fire, have drastically reduced chances of survival.
- c. Flashover can occur within a relatively short period of time. Precisely controlled scientific tests indicate that flashover can occur in as little as two minutes from the flame stage. On the other hand, field observations of actual fires indicate that total room involvement can take as long as 20 minutes or more. There is no way to ascertain the time to flashover since it is not possible to determine when a fire started. Nevertheless, a correlation can be drawn between flashover and the entire fire protection system. As suggested previously, the number of times that fires are controlled before flashover depends on the entire fire protection system and is not solely dependent on emergency response forces. Built-in fire protection, public education, extinguishment by citizens, and even the type of fuel on fire are all factors that affect flashover. Even when fires are not extinguished by firefighting forces, these personnel often provide other services, ranging from smoke removal to the restoration of built-in fire control systems. The objective is all components of the fire protection system, from public education to built-in fire protection to manual fire suppression, are maintained at a level to provide adequate service and the performance of each is periodically evaluated. Flashover is a critical stage of fire growth, as it creates a quantum jump in the rate of combustion and a significantly greater amount of water is needed to reduce the burning material below its ignition temperature. A fire that has reached flashover often indicates it is too late to save anyone in the room of origin, and a greater number of firefighters are required to handle the larger hose streams needed to extinguish the fire. A post-flashover fire burns hotter and moves faster, compounding the search-and-rescue problems in the remainder of the structure at the same time more firefighters are needed for fire attack.

The Significance of Flashover

<i>Pre-Flashover</i>	<i>Post-Flashover</i>
<i>Limited to one room</i>	<i>May spread beyond one room</i>
<i>Requires smaller attack line</i>	<i>Requires larger, more attack lines</i>
<i>Search and rescue is easier</i>	<i>Compounds search and rescue</i>
<i>Initial assignment can handle</i>	<i>Requires additional fire companies</i>



Flashover Time-Temperature Curve

Staffing and equipment needs can be reasonably predicted for different risk levels and fire stages. The correlation of staffing and equipment needs with fires according to their stage of growth is the basis for response coverage. The goal is to maintain and strategically locate enough firefighters and equipment so a minimum acceptable response force can reach a reasonable number of fire scenes before flashover and intercede in critical medical emergencies. To minimize risk, the department strives to extinguish small fires quickly before they reach flashover potential to minimize risk and to mitigate medical emergencies quickly to reduce cardiac death. As flashover is such a significant fire event, preventing this stage of fire behavior is imperative. Time is a key factor in this effort. Once flashover potential is reached, an exponential increase occurs not only in the rate of combustion, but in the amount of resources necessary to mitigate the fire emergency.

The Washoe County Board of County Commissioners has already established a Service Level Objective with the creation of the Washoe County Established Fire and EMS Response Times. The Chart below outlines those response goals. The problem with these response time goals is the lack of accurate measurement. Truckee Meadows Fire Protection District does not have the capability currently to evaluate Fractile Response times. Many fire departments report average response times while

others report *fractile* response times. Average response times have been increasingly less used by the emergency service industry because small numbers of very short or long responses—often recorded in error—can distort the results. Also, the public is interested in how fast a system responds in most cases (fractile) rather than usually (average). More and more departments are adopting the 90th percentile for reporting response times (mostly due to NFPA 1710's use of this measure). A fractile response time of x at the 90th percentile means that units respond in x minutes, or less, 90 percent of the time. The remainder beyond the compliance fractile (90th percentile in this case) is the operational tolerance for the system, meaning the system is designed with the understanding that 10 percent of the calls will have response times that exceed the target.

Washoe County Established Fire and EMS Response Times*
May 2007

General Rural	Fire- EMS Response	20 + Minute Response Time
Rural Lands	Fire- EMS Response	10-20 Minute Response Time
Suburban Lands	Fire- EMS Response	5-10 Minute Response Time
Urban Lands	Fire –EMS Response	5 Minute Response Time

*Response time is measured from the time the initial call is received until the arrival of the first emergency vehicle

Source: Washoe County Comprehensive Plan, Land Use/Transportation Element, May 2007

EVALUATING EMS CAPABILITIES

Additionally, survival of cardiac death or in a fire preventing flashover is often time driven. The brain can only be without oxygen for a short period of time, i.e., four to six minutes. Rapid intervention is necessary to prevent brain death from occurring. From an emergency medical perspective, the service-level objective typically is to provide medical intervention within a six-minute timeframe, as brain damage is very likely at six minutes without oxygen. However, in a cardiac arrest situation, survivability dramatically decreased beyond four minutes without appropriate intervention. Intervention includes early recognition and bystander CPR. The research recommends using the Utstein reporting criteria for outcomes research and capture of the following time stamps/points in the cascade of events in an EMS call that should be tracked. Early defibrillation is often called the critical link in the chain of survival because it is the only way to successfully treat most sudden cardiac arrests. When cardiac arrest occurs, the heart starts to beat chaotically (fibrillation) and can not pump blood efficiently. Time is critical. If a normal heart rhythm is not restored in minutes, the person will die. In fact, for every minute without defibrillation, the odds of survival drop seven to ten percent. A sudden cardiac arrest victim who is not defibrillated within eight to ten minutes has virtually no chance of survival. The shortest possible response times create the highest probabilities of resuscitation. An important evaluation point lost on most agencies is the time that crews reach patient side. Often the clock stops when the vehicle arrives or stops at the address. The key to a successful outcome is the point the patient is actually contacted. In larger complexes or at very large homes located within gated communities, this time period can be substantial and can most certainly affect the outcome due to delayed intervention.

Event Initiation

The point at which factors occur that may ultimately result in an activation of the emergency response system; or the time period in which an individual has clearly identified that there is a threat to life and property and that remedial action must be taken immediately or there will be definable losses.

Precipitating factors can occur seconds, minutes, hours, or even days before a point of awareness is reached. A patient who ignores chest discomfort for days until it reaches a critical point, at which the patient makes a decision (point of Awareness) to seek assistance. Rarely is it possible to quantify the point at which event initiation occurs.

Emergency Event

The point at which an awareness of conditions exists that requires an activation of the emergency response system. Considered the Point of Awareness, it may be the recognition by an individual that assistance is needed, or it may consist of a mechanical or electronic recognition of an event such as smoke or heat detector activation.

Alarm

Alarm is defined as the ***period of time*** in which a human being or mechanical device takes to detect a set of circumstances that require response on the part of public safety forces to locate, access and begin to communicate with a public safety agency that is required in order to mitigate the emergency. Alarm notification time includes the dialing of telephones, the completing of circuits and all elements that are required for the transmission of coded messages or electronic impulses in order for the receiving party to identify that a state of emergency exists.

Alarm notification is distinguished from the normalcy state by virtue of the fact that the individual who is aware of the emergency realizes they must have extra assistance or that the mechanical device such as heat detectors, smoke detectors and sprinkler systems reach their minimum threshold and operate. This element also includes the activation of equipment to alarm receiving facilities such as Central Station and third-party providers. This is when the emergency is reported.

Notification

Commencement of notification is defined as the ***point in time*** when the first electrical impulse or indicator that can be identified and recorded by the public safety agency. This is the agency that is responsible to act/respond and start collection of hard data. In the Truckee Meadows Fire Protection District emergency calls first go to the PSAP (Public Safety Answering Point), which is ECOMM.

Alarm Processing or Dispatch Time

Alarm processing time is defined as the ***period of time*** that is required for the communications center to identify the fact that an emergency is in progress, collect the information pertinent to making the appropriate dispatch and access the methodology used by the agency to deploy its resources.

Alarm processing time is essentially the entire time interval between realization that an emergency is in existence up to the point that this information is retransmitted via the internal alarm system to the attention of the specific agency's resources. The benchmark for this element of response time is 95% of all alarms will be dispatched within a 60 second time frame.

Turnout Time

Turnout time is defined as the *period of time* that it takes for response personnel to discontinue the activities that they are engaged in, properly attire themselves, and board the vehicle in readiness for response. Turnout time shall include the elapsed time between notification alert of an emergency event in progress and the emergency vehicle actually beginning to respond to the identified address or location.

The Truckee Meadows Fire District requires all personnel to be fully dressed for the dispatched event prior to entering the response vehicle and responding. The Truckee Meadows Fire District has two completely different protective clothing scenarios: one for structural firefighting, and vehicle extrication, and one for wildland firefighting. The nationally recognized benchmark is 60 seconds.

Travel Time

Travel time is defined as the *period of time* between the vehicles beginning their *uninterrupted* response and the actual time that the emergency response vehicle arrives at the address or location to which it has been dispatched. Travel time includes driving distance and delays caused by misinformation in the dispatch, traffic obstruction and/or geographical obstacles. Travel time ends when the vehicle is declared on-scene by the first arriving unit officer. The national response standard is based on 35-mpg average or 53.1 feet/second.

On-Scene Time

On-scene time is defined as the *point in time* that the first due responding emergency vehicle or responsible command officer arrives at the scene of an emergency and begins to take immediate action or take command of the rest of the response force. On-scene time is only accurate if the officer or individual in charge is in a position to actually begin to assess the nature of the emergency. Generally speaking, this is the same as the stoppage of the vehicle, but may be extended in the event of extremely large area buildings, wildland events that are significantly off the road, mid-rise and/or circumstances in which the original address was inaccurate requiring additional travel time.

Initiation of Action

This is defined as the *period of time* of actual involvement by the individual crewmembers or company in the reduction of the state of emergency at the scene. It is an indication of total commitment at the scene. This period is not terminated until such time as the fire officer or other individual with jurisdiction determines that the organized fire unit can be placed back in service and/or respond to an additional emergency.

Some fire agencies declare a unit as “in Service” but keep it on the scene for further activity. For purposes of defining fire service activity levels, a company is not to be considered to be free of an emergency until allowed to leave the scene.

Termination of the Incident

This is defined as the time when an event is declared terminated and all deployed agency resources are available for another assignment. The period of time between arrival and availability for response is measured by the factor of response reliability.

Total Response Time

Total response time is calculated from the time point at which the alarm is reported (notification) to the time point when units arrive at the emergency event (on scene).

If a state of normalcy exists, there is no need to call emergency services to the scene. However, once an event initiation begins and the cascade of events begins to unfold, the degree of loss of life and property that can be prevented may be impacted by the passage of time.

For purposes of this coverage document, response time is a compilation of the elements beginning with alarm processing time up to on scene time. It has three elements:

1. Alarm processing time
2. Turnout time
3. Travel time

Therefore, for purposes of definition and the need to establish a common benchmark for purposes of evaluating response time accreditation criteria, the following times should be made available and used in defining base line norms for a candidate agency:

Response Time -

- | | | |
|----------------------------------|---|---------------------|
| A. Notification/Alarm Processing | = | 60 second benchmark |
| B. Turnout Time | = | 60 second benchmark |
| C. Travel Time | = | |

General Rural	Fire- EMS Response	18 + Minute Response Time*
Rural Lands	Fire- EMS Response	8-18 Minute Response Time*
Suburban Lands	Fire- EMS Response	3-8 Minute Response Time*
Urban Lands	Fire –EMS Response	3 Minute Response Time*

*Time adjusted for Notification/Alarm Processing and Turnout Time

$$\text{Total Response Time} = A + B + C$$

TMFPD utilizes the services of ECOMM for its dispatch services. The largest flaw within the system is that the time stamp criteria does not divide the incident into hundreds of a second. An example is that at each dispatch milestone (receipt of call, dispatch of call, units arrival at scene etc. there could be up to a 59 second error on each time stamp. For example if the call comes in at 14:02 PM, it could actually come in at 14:02:01 PM or 14:02:59 PM offering up to :59 second error at every time stamp. A total response could be significantly altered based upon this information. This a Service Level Objectives established by the Board of County Commissioners. That coupled with average response times, rather than fractile response times does not allow for an accurate accounting of fire district operations.

Deployment – Distribution and Concentration

Deployment is measured and typified from two concepts, which are influenced by response time and create an effective response force for *each risk category*:

Distribution: The locating of geographically distributed, first-due resources, for *all-risk* initial intervention. These station locations(s) are needed to assure rapid deployment to minimize *and* terminate average, routine emergencies.

Distribution is measured by the percentage of the jurisdiction covered by the first-due units within *adopted public policy response times*. Policies shall include “benchmarks” for intervention such as: arrival prior to or at flashover; arrival on EMS incidents prior to brain death in cardiac arrest. From risk assessment and benchmark comparisons, the jurisdiction will use critical task analysis to identify needed resource distribution and staffing patterns.

A sample distribution policy statement could be:

*“For 90% or 4 minute response time of all incidents, the first-due unit shall arrive within six minutes **total reflex** time. The first-due unit shall be capable of advancing the first line for fire control **or** starting rescue **or** providing basic life support for medical incidents.”*

Deployment Evaluation for the Truckee Meadows Fire Protection District

There are three National Fire Protection Association (NFPA) standards that contain time requirements that influence the delivery of fire and emergency medical services. These are NFPA 1221, Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems; NFPA 1710, Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments; and NFPA 1720, Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Volunteer Fire Departments.

NFPA 1710 contains time objectives that shall be established by career fire departments as follows:

- Turnout time: One minute (60 seconds) for turnout time
- Fire response time: Four minutes (240 seconds) or less for the arrival of the first arriving engine company at a fire suppression incident and/or eight minutes (480 seconds) or less for the deployment of a full first alarm assignment at a fire suppression incident
- First responder or higher emergency medical response time: Four minutes (240 seconds) or less for the arrival of a unit with first responder or higher-level capability at an emergency medical incident
- Advanced life support response time: Eight minutes (480 seconds) or less for the arrival of an advanced life support unit at an emergency medical incident, where the service is provided by the fire department

The standard states that the fire department shall establish a performance objective of not less than 90

percent for the achievement of each response time objective. NFPA 1710 does contain a time objective for dispatch time by requiring that “All communications facilities, equipment, staffing, and operating procedures shall comply with NFPA 1221.”

For the purposes of NFPA 1710, the following definitions apply:

- Dispatch time: The point of receipt of the emergency alarm at the public safety answering point to the point where sufficient information is known to the dispatcher and applicable units are notified of the emergency
- Turnout time: The time that begins when units acknowledge notification of the emergency to the beginning point of response time
- Response time: The time that begins when units are en route to the emergency incident and ends when units arrive at the scene

NFPA 1720 contains a time objective for dispatch time by requiring that “All communications facilities, equipment, staffing, and operating procedures shall comply with NFPA 1221, Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems.” NFPA 1720 contains no time requirements for turnout and response times.

NFPA 1221 requires that 95 percent of alarms shall be answered within 15 seconds, 99 percent of alarms shall be answered in 40 seconds, and the dispatch of the emergency response agency shall be completed within 60 seconds 95 percent of the time. The time lines for dispatching shown are taken from NFPA 1221:

- After the receipt of a call for assistance, the fire department will respond with the first unit to that location within three minutes.
- After receipt of a call for assistance, the fire department will respond with a unit to that location, within four minutes, to 90 percent of area served.
- After receipt of a call for a medical emergency, the fire department will respond with an engine company to that location within four minutes and an ambulance within six minutes.

We are unable to determine if The Truckee Meadows Fire Protection District meets the established response time goals due to lack of Fractile response times.

The Insurance Services Office (ISO) recommends that the first due engine company should be located within 1.5 miles of major built up areas.

Truckee Meadows Fire Protection District does not meet the 1.5 mile fire station location criteria, but has done a acceptable job of location stations with the Interlocal agreement. Fire station locations must consider acceptable risk and the Interlocal agreement has made both Reno and TMFPD a very robust and efficient system.

Truckee Meadows Fire Protection District Future Fire Stations

Many factors can cause a fire department not to meet its response time goal (as established by the Board of County Commissioners). These might include, but are not limited to the following:

- Extremely heavy traffic patterns during specific periods of time.
- Concurrent alarms that result in engine companies having to come out of district more often than they should to provide first response into another district.
- Seasonal weather conditions.
- Specific community events that have a negative impact on the availability of a fire company to meet its response time goals.

This analysis leads to a series of potential thresholds. The factors that are being evaluated to mitigate the problem could be such things as:

- Adding an additional fire station;
- Outfitting a second company in an existing fire station;
- Requiring improvements in the road transportation network; and
- The inclusion of traffic expediting devices such as signal control by the fire service and emergency services.

Then it is also conceivable that you could minimize risk by requiring built-in fire protection in those areas that are beyond the travel distances established by the Board of County Commissioners or the actual response times that cannot currently accurately be evaluated. The single and multi-family occupancy is the primary occupancy for the loss of life and property according to the United States Fire Administration. Therefore, any time there is a concentration of single family and/or multi-family dwellings in which there is a sense of community, there is an expectation of fire service levels being consistent with the level of service throughout the remainder of the community, this is a difficult task in a non-urban or suburban environment.

It is obvious that Truckee Meadows Fire Protection District could relocate at least one fire station to improve its response times if a new Joint Powers Agreement could be agreed upon. The question really is about acceptable risk, does the cost of relocating a fire station affordable to the constituents of the Truckee Meadows Fire Protection District? Our analysis based upon response times and value and population would indicate that relocating Truckee Meadows Station 16 to an area on the very north end of Washoe Valley would not make sense at this time. Truckee Meadows has planned for this fire station relocation and has allocated money in its reserves towards this goal, but further analysis is needed to determine if this will best serve the citizens of the Truckee Meadows Fire Protection District.. Reno and Truckee Meadows are also looking at the closure of the Truckee Meadows Facility at Old Virginia Road and re-stationing the Truckee Meadows equipment (within the same response district) with a new Reno Engine at Damonte Ranch and Veterans Parkway. This plan would result in no net gain but provide a cost reduction in facility maintenance and utilities.

The Reno/TMFPD plan for station location needs more study which would include improvement of data analysis, and the completion of U.S. 395

- Concentration: the spacing of multiple resources arranged (close enough together) so that an “effective response force” can be assembled on-scene within *adopted public policy* time frames. An “initial” effective response force is that which will most likely stop the escalation of the emergency for each risk type.
 - o Concentration is measured by risk category type - high-risk areas need second and third due units in shorter time frames than in typical or low risk areas.

Concentration pushes and pulls distribution and there is no one perfect mathematical solution. Each agency after risk assessment and critical task analysis has to be able to quantify and articulate why its resource allocation methodology meets the governing body’s adopted policies for initial effective intervention on both a first-due and multiple unit basis.

The Interlocal agreement has added immensely to the concentration, performance and reliability of TMFPD

Performance and Reliability

How reliable is your response system, does the agency frequently see multiple calls for service (stacked, or queued calls) and do these degrade performance? Are there predictable times of the day, week or year when queued calls occur? Can these occurrences be controlled or can peak hour staffing be used?

National Rating Systems

Insurance Services Office

Insurance companies were the driving force in fire protection in the early 1800’s. Insurance companies would issue to subscribers metal identification marks to be placed on the homeowners’ dwelling, these marks served to notify fire companies that the dwelling was insured. Great fires in the 1800’s were the rule rather than the exception. In the event of a fire, the first arriving fire company would be compensated for salvaging the belongings of the insured party. This system often led to general disruption at the scene of an emergency and often contributed to conflagrations.

The National board of Fire Underwriters was an organization that was concerned about the large fire loss and conflagration hazards in the 1800s. The NBFU began to survey large cities for its members to identify why large-loss fires in cities were occurring and how they might be prevented. In their surveys, they noted building conditions, fire department equipment and staffing, firefighting water supplies and other fire protection factors. When all of the material was put together from these surveys, it formed the embryo of today’s Insurance Services Office ratings. Today’s document is now known as “Standard Grading for Grading Cities, and Towns of the United States with Reference to their Fire Defenses and Physical Conditions”. This “Grading Schedule” became one of the criteria by which insurance companies determine fire insurance rates for any given city or town. The Insurance Services Office continued to refine this process which is still in use today. ISO field engineers. These engineers

examine and grade water supply, fire department equipment, operations, staffing, training, fire prevention, fire communications, building and code enforcement, building conditions, conflagration protection and records and reports. Each of the areas noted are given a maximum number of potential deficiency points. Large cities are only assessed on their fire loss in any year, smaller jurisdictions like the Truckee Meadows Fire Protection District are subjected to in-depth analysis by field engineers.

Relative Values and Maximum Deficiency Points

Feature	Percent	Points
Water Supply	39%	1950
Fire District	39%	1950
Fire Service Communications	9%	450
Fire Safety Control	13%	650

Relative Grading of Municipalities in Fire Defenses and Physical Conditions Points of Deficiency Class Of Municipality

0-500	Class 1
501-1000	Class 2
1001-1500	Class 3
1501-2000	Class 4
2001-2500	Class 5
2501-3000	Class 6
3001-3500	Class 7
3501-4000	Class 8
4001-4500	Class 9
More than 4500	Class 10

The ISO provides a fire defense grading to insure that Cities are not prone to large loss conflagrations. Insurance companies base their rates on these grades, consistent with State insurance regulations. This is one form of analysis of a fire department, but one that does not consider the many other important components of a fire and life safety system. ISO does not grade emergency medical services, response to hazardous material incidents or disaster preparedness. This system of evaluating a fire department solely on its fire suppression capabilities has lost credibility with members of the International City Managers Association, the International Fire Chief's Association and many related professional fire service groups.

The highest grade a fire department can receive from the Insurance Services Office is a 1. Currently Truckee Meadows Fire Protection District has a rating of 5 in areas that have fire hydrants, and Truckee Meadows Fire Protection District has a rating of 8 in areas that do not have fire hydrants.

Reference

Insurance Service Office

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) 1710

Origin and Development of NFPA 1710

The development of this standard adopted in 2000 was the result of a considerable amount of work over several years by the technical committee members appointed by NFPA representing several fire and governmental organizations. In the case of this standard, their work is the first organized approach to developing a standard, defining levels of service, deployment capabilities, and staffing levels for those “substantially” career fire departments. Research work and empirical studies in North America were used by the committee as a basis for developing response times and resource capabilities for those services being provided, as identified by the fire service. NFPA 1710 provides the user with a template for developing an implementation plan in respect to the standard. The NFPA 1710 standard set forth in concise terms the recommended resource requirements for fires, emergencies, and other incidents.

The standard is currently in a review cycle and changes may occur in the standard, effective in 2009.

There are three levels of EMS provision recognized in the NFPA 1710 standard:

1. First responder with automatic external defibrillator (AED)
2. Basic life support (BLS)
3. Advanced life support (ALS)

The standard also recognizes EMS transport as a service that may be provided by the fire department. It is not a requirement that a fire department provide all levels of EMS service beyond first responder (AED). However, the standard establishes operational requirements for each level provided by a department. For each level operational requirements are set forth as follows:

- a) First Responder (AED)—A fire department must appropriately train all response personnel at the first responder with AED capability level and personnel must arrive within a four-minute response timeframe to 90 percent of all emergency medical incidents. The number of personnel must be sufficient to assure adequate care capability and member safety.
- b) BLS—A fire department providing BLS beyond the first responder level shall adhere to staffing and training requirements as set forth by the state or provincial licensing agency. The department must also deploy sufficient mobile resources to arrive within a four-minute response timeframe for 90 percent of all incidents.
- c) ALS—A fire department that provides ALS beyond the first responder and BLS levels shall adhere to staffing and training requirements as set forth by the state or provincial licensing agency. The department must also deploy sufficient mobile resources to arrive within an eight minute response timeframe for 90 percent of all incidents.

Truckee Meadows Fire Protection District currently has EMT Intermediate on all engines, this is a blend of BLS and ALS services that has proven to be cost effective and efficient for the residents of Truckee Meadows.

Special Challenges and Wildland Operations

The fire department is required to formally define the types of special operations required or expected to be performed in an emergency or other incident. These types of special operations include, but are not limited to, hazardous materials response,

confined space response, technical rescue, high-angle rescue, and water rescue. Regardless of the fire department's defined special operation capability, all firefighters who provide emergency response must be trained to the first responder operations level for both hazardous materials and confined space responses. Likewise, all fire departments must define their response capability to natural disasters, terrorism incidents, large-scale emergencies, and mass casualty events.

The Truckee Meadows Fire Protection District in cooperation with the Reno Fire Department has established a variety of special operations capabilities including hazardous material response, urban search and rescue and water rescue operations. .

The NFPA 1710 standard recognizes many, if not most, fire departments must respond to either wildland or wildland/urban interface fires. Accordingly, the fire department must address the service delivery for such occurrences. The standard specifies the minimum wildland staffing for defined wildland companies, as well as engine companies that respond to wildland or urban interface/wildland emergencies. Likewise, deployment requirements for a wildland initial direct attack are specified. The Truckee Meadows Fire Protection District is well suited to respond to initial Wildland fires, and is well versed in bringing in outside resources to combat these fires.

A system is a functionally-related group of components. These are areas where a set of needs or requirements work closely together and are interrelated to achieve a key result. The NFPA 1710 standard addresses five of these systems.

- **Safety and Health**—Each organization must have an occupational safety and health program meeting the requirements of NFPA 1500, Standard on Fire Department Occupational Safety and Health Program
- **Incident Management**—Each organization must have in place an incident management system designed to handle expected incidents. The system must be in accordance with NFPA 1561, Standard on Emergency Services Incident Management System.
- **Training**—Each organization must ensure members are trained to execute all responsibilities consistent with its organizational statement. This training must be accomplished using a programmatic approach that includes a policy.
- **Communications**—Each organization must have a communications system characterized by:
 - o Reliability
 - o Promptness
 - o Standard operating procedures, terminology and protocols
 Departments must also comply with all the requirements set forth in NFPA 1221, Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems.
- **Pre-Incident Planning**—Safe and effective operations are grounded in identifying key and high hazard targets. The standard requires

departments to develop operational requirements to obtain information regarding these locations.

Together, these five systems help to ensure emergency responders have the essential tools, information, procedures, and safeguards to operate effectively and efficiently.

Evaluation of TM 1710 Compliance	National Standard
Safety and Health	Extensive- Meets Standard
Incident Management	Meets Standard
Training	Meets Standard
Communications	Meets Standard
Pre-Incident Planning	Extensive-Meets Standard

RESPONSE RELIABILITY

Response reliability is defined as the probability that the required amount of staffing and apparatus will be available when a fire or emergency call is received. The response reliability of the fire department would be 100 percent if every piece of its apparatus were available every time an emergency call was received. In reality, there are times when a call is received for a particular company but the company is already on another call. This requires a substitute (second-due) company to be assigned from another station. As the number of emergency calls per day increases, so does the probability that a needed piece of apparatus will already be busy when a call is received. Consequently, the response reliability of the fire department for that company decreases, which will have an impact on department travel times to emergencies. The size of the area that a station covers, the number of calls, the types of calls, and the population density all affect response reliability. The more densely populated, the more likely a second-due call will occur. An analysis of current response data can reveal variations in the response reliability among stations. The optimal way to track response reliability would be to analyze the total call volume for a particular fire management area and then track the number of double and triple calls to assess what the true response reliability is for that given area and the companies assigned to respond into the area.

Service level goals are established based upon federal and state legislation, such as 2 In/2 Out, federal and state OSHA requirements, ISO grading schedule, national standards such as the one developed by the NFPA and best practices found in the CFAI agency accreditation process.

The service level goals identified by Truckee Meadows Fire Protection District are consistent with National Standards. The critical tool is the evaluation of those Standards. They is difficult do to the fact that the system does not utilize Fractile Response Times and that the calls are not indexed to Census Tract information.

Overall Evaluation

From a purely operational standpoint the Interlocal Agreement has been a great benefit to the Citizens of the Truckee Meadows Fire Protection District. The combination of the Reno Fire Department, The Truckee Meadows career staff and the volunteer fire departments within the system create a well versed, robust fire and life safety system. There are a few operational issues that need to be addressed which include:

Refinement of dispatch for medical emergencies with REMSA

Refinement of dispatch for fracture response times

Refinement of dispatch with geo coding census tracts

Moving ahead with the fire station /facility refinement plan as outlined by the Interlocal Agreement

Refinement of the information flow to the Board of Commissioners on Truckee Meadows Fire Protection District operations